SOCIAL AND ENVIRONMENTAL PLANNING CONSULTANTS

FINAL

BERKELEY

SOLID WASTE MANAGEMENT CENTER

ENVIRONMENTAL IMPACT REPORT

SCH #79040248

March, 1980

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FORWARD

This document is the Final Environmental Impact Report (FEIR) for the Berkeley Solid Waste Management Center (SWMC).

Berkeley is unique among Bay Area communities in that it operates its own municipal refuse collection service and, through contract, its own sanitrary landfill operation which is situated on filled Bay tidelands along the City's western edge. However, the landfill is rapidly approaching saturation and, due to increased near-by urbanization and various environmental concerns, it it not likely that a suitable disposal site can be identified within acceptable haul distances of the collection routes. As a consequence, it became apparent to Berkeley planners as early as 1971 that a facility would need to be developed which would permit the transfer of collected wastes from the collection vehicles to larger, over-the-road trucks having superior payloads and lower ton per mile transport costs. Thus, the initial goal of the SWMC was development of a transfer station.

The problem of solid waste management gained considerable State and Regional recognition during the mid-1970's and, in response, attempts have been made to coordinate the planning and development of solid waste management facilities. In Alameda County (wherein Berkeley reposes) the Alameda County Solid Waste Management Authority was formed by a joint powers agreement to coordinate the planning and development of future County facilities. The Authority was aware of Berkeley's situation and, in most of the Authority's published strategies, provided for the inclusion of Berkeley's transfer station; however, following engagement by Berkeley of consultants to develop facilities plans for the SWMC, the Authority decided upon a County-wide transfer station scheme which expanded the proposed SWMC's ultimate daily capacity from 360 tons to 810 tons per day.

The permit process for solid waste management facilities requires the certification of conformance with the County Plan; therefore, Berkeley's Consultants were required to evaluate the potential of the proposed SWMC to be expanded to the 810 tons per day capacity outlined by the County Plan. That evaluation indicated that such an objective could be achieved within the site confines; however, it would require the elimination of various other solid waste management functions planned for the site.

Following release of the Draft EIR (February, 1979), much negative comment was received from the public regarding the prospect of an 810 ton per day facility in Berkeley and, partially as a consequence, the Alameda County Solid Waste Management Authority engaged consultants to re-evaluate the County's Facilities Plan. The County Consultant's recently completed recommendation includes a new transfer station scheme for the County which identifies the Berkeley SWMC as a 355 ton per day facility.

Throughout the following document, several references are made to a Phase II, 810 ton per day facility; however, at the present time, there is no intention of expanding the Berkeley SWMC to that level. It should be clear, that certification of this document covers only the Phase I facility and any future modifications to the Phase I facility will require the development of a subsequent environmental document prior to approval.

SUMMARY

The City of Berkeley operates its own municipal refuse collection/disposal system and, as such, is unique among Bay Area communities.

The City currently disposes of its collected refuse at a sanitary landfill operation, situated on the Berkeley waterfront, in close proximity to the terminus of its municipal collection routes; however, this disposal site is rapidly approaching saturation and public opposition render the siting of a similar, close-in replacement operation infeasible. Moreover, existing alternative landfill sites, situated within acceptable economic haul distances of the City's collection routes are likewise approaching saturation. Finally, increasingly stringent environmental considerations make it clear that future refuse disposal sites will be in short supply and situated at considerable distances from the City. Therefore, it is incumbant upon the City to develop a means of concentrating collected wastes and transferring them to vehicles displaying superior payload characteristics to those of the present collection fleet.

As a consequence, the City commissioned the preparation of facilities plans for a Solid Waste Management Center (SWMC) which will, when operational, reduce the amount of collected solid waste ultimately destined for landfill disposal and facilitate its transfer to higher payload, over-the-road transport vehicles.

The Center, as conceptualized, would extract marketable materials from the collected waste stream such as: paper, cardboard, and ferrous components which would be subsequently marketed for reuse and salvage. Additionally, the Center would provide opportunities for citizens to dispose of and/or purchase previously used items for reuse such as white goods (stoves, refrigerators, etc.) and building materials. Finally, the SWMC would test the feasibility of recovering energy by incinerating the "light fraction" of the waste stream to provide low-pressure steam.

The proposed project would be located near the intersection of Second and Gilman Streets in Berkeley.

Various impacts upon the environment are associated with the construction and operation of the project; among which are:

- o Increased ambient noise levels
- o Degradation of regional air quality
- o Increased near-site traffic conjestion
- o Elevated risks to human health and safety.

This document discusses these impacts which, for the most part, are expected to be of short-term, detectable only within close proximity of the SWMC, and responsive to mitigation measures. Moreover, candidate mitigation measures are discussed which are recommended to bring impacts of the proposed project within ranges of normal community acceptance.

The proposed project is expected to provide the long-term benefit of a facility which is designed to manage the City's solid waste stream in a manner that is environmentally superior to present practices.

CHAPTER I

BACKGROUND

In 1913, the City of Berkeley (by grant of the California Legislature) acquired title to the public tidelands, along the City's western shore, and initiated a series of dike and fill operations to dispose of its municipal solid waste. This operation continues to the present day and daily, approximately 200 tons of unclassified municipal waste are received, distributed, compacted, and covered with a layer of soil in accordance with conventional sanitary landfill practices.

Nationally, the stream of solid waste materials requiring ultimate disposal has changed dramatically, both in quantity and in composition, over the past two decades, as have solid waste collection and disposal practices. An enlarged population base concentrated in urban clusters, increased popularity of non-returnable beverage containers, the widespread use of food packaging materials, and an attitudinal shift which has led to the designation of the present generation as the "throw-away society" have been largely responsible for the growth of the solid waste stream. Urban sprawl and increased public sensitivity to environmental quality matters have greatly influenced traditional disposal practices. Thus, the overall social and economic cost of solid waste management has increased.

The municipal solid waste stream is beginning to be recognized as a valuable source of materials and energy; in fact, some have labeled it the "urban ore base". Consequently, as the economic costs of disposing and replacing many of the solid waste stream materials grows higher, methods of recovery and reuse become more appealing.

Berkeley is one of the few Bay Area communities that continues to operate a municipal refuse collection system and which owns its own disposal site. The site, which is operated by an entrepreneur under contract to the City, is located within close proximity to the City, and the direct haul of refuse by collection vehicles to the disposal site is economically viable; however, the site is approaching saturation and there is no possibility of locating a replacement disposal site within an economically feasible proximity.

Berkeley's plight is by no means unique; in fact, this state of affairs is so widespread that both State and national attention has recently been focused on alternatives promising some solutions. In July, 1973 the California Legislature passed Senate Bill 5 which created the State Solid Waste Management Board and which provided that the primary responsibility for solid waste management and planning should rest with local government. This measure required that each of the State's 58 counties prepare (subject to the approval of the majority of cities within the county containing a majority of the population residing in incorporated areas) a comprehensive solid waste management plan.

The Solid Waste Management Plan for Alameda County was prepared, under the guidance of the Alameda County Planning Department, by a 23 member Solid Waste Management Plan Advisory Committee consisting of elected and appointed officials, citizen appointees, and a Technical Advisory Committee. This plan has been approved by the State.

The Alameda County Solid Waste Management Plan is a response to a State requirement contained in SB 5. The elected officials of 17 agencies in Alameda County executed a joint powers agreement in 1976 which created the Alameda County Solid Waste Management Authority. This Authority was granted the powers of plan development in March 1977 and has to date developed two (2) Plan Elements which are: 1) the Short-Term Facilities Plan and 2) the Medium-and Long-Term Facilities Plan.

The Short-Term Facilities Plan contained the following statements of policy:

- Any jurisdicition which can use and import garbage can develop a sophisticated system for dealing with the program and may proceed as long as the system added is advanced or improved over burial and is in conformance with the goals of the plan.
- Conservation of landfill sites should be encouraged through use of compaction at existing sites; source separation and source reduction.
- The Solid Waste Management Authority shall develop and adopt administrative procedures to facilitate implementation of the Solid Waste Management Facilities Plan at the earliest possible time.

In addition to these policy statements from the short-term plan, there are other policy statements from the plan which bear on the proposed project. In the interest of brevity, only the applicable facilities policies are reproduced below:

- Changes which are made in the waste management system to achieve local, State, or Federal goals of material or energy recovery may alter the costs of the refuse service; it is understood that costs and benefits of achieving said goals are to be passed to the users of the system.
- Needed facilities will be developed in conformance with Plan Policies and with the concurrence or approval of the County Solid Waste Management Agency.
- Local jurisdictions are responsible for collection services and franchising for that service; rates and franchise fees are a local prerogative, and local jurisdictions may benefit by recognizing the goals of Joint Refuse Rate Committee and the areawide evaluation of common problems.
- Cities and special districts will continue to accept the responsibility for the waste generated within their borders and retain the right to dispose of or utilize their solid waste to their best advantage.
- Transfer and processing facilities, long haul and disposal sites existing or proposed are to be in conformance with the Plan.

- o The location of the transfer stations should be carefully examined for efficiency and cost-effectiveness and a County-wide transfer facilities plan developed.
- o Resource and energy recovery should take place at the transfer station or the site of optimum resource and energy recovery.
- o Transfer facilities will be needed for the metropolitan area of Alameda County (Albany to Hayward) and should be located to efficiently serve collection routes in each area. Such facilities would separate ferrous and non-ferrous metals, reuseable fibers (wood and paper), glass, and other materials for which adequate markets exist. They would apply the most feasible proven technology to this problem.

Based upon these policies, the Authority directed that four (4) new transfer stations be located in the West County area. New transfer stations were identified by the Medium-and Long-Term Facilities Plan for: Berkeley, San Leandro, Hayward, and Fremont. The Berkeley Solid Waste Management Center (SWMC), which is in general conformity with the Alameda County Solid Waste Management Plan, is the subject of this Environmental Impact Report (EIR).

CHAPTER II

PROJECT DESCRIPTION

OBJECTIVE

The objective of the proposed project is the construction of a Solid Waste Management Center (SWMC), with resource recovery and transfer station capabilities, for an ultimate daily throughput of approximately 810 tons.* This facility is identified as T-1 by the County's Medium-and Long-Term Solid Waste Facilities Plan [Alameda County Solid Waste Management Authority; October, 1978].

Additionally, the proposed project would test the feasibility of using modular package incinerators to produce low-pressure steam from refuse-derived-fuel (RDF).

PHASED PROJECT

The proposed project would most likely be constructed in two or more phases. Phase I would be designed to accommodate Berkeley's solid waste stream and would be sized for a 360 ton per day (TPD) throughput. This phase of the project would be funded by the City (and possibly through Federal or State grants to the City).

Subsequent phases of the proposed project would be funded by Alameda County (or by Federal or State grants to the County).

LOCATION

The proposed project would be situated on a 6.3 acre site on the fringe of the City's industrial section. The site is bounded by: Second Street to the west, Gilman Street to the south, the Southern Pacific Railroad tracks (Third Street) to the east, and industrial property to the north. It lies approximately 0.5 miles from the intersection of Gilman Street and San Pablo Avenue (the City's major industrial and commercial throughfare) and within 2.75 miles of the Central Business District (CBD).

Most of the site is presently vacant while the remainder is occupied by industrial type buildings. A caustic lime bed, the residue of an industrial process formally undertaken on-site, occupies a portion of the vacant area.

Figure II-1 displays the study site's relationship to the San Francisco Bay Region and Figure II-2 is a site map.

FACILITIES

The facilities of the proposed project are separated for discussion into Phase I facilities and Phase II facilities.

*Please see Forward for discussion regarding the change in ultimate project size which has been determined since publication of the Draft EIR.

FIGURE II-1

REGIONAL SETTING

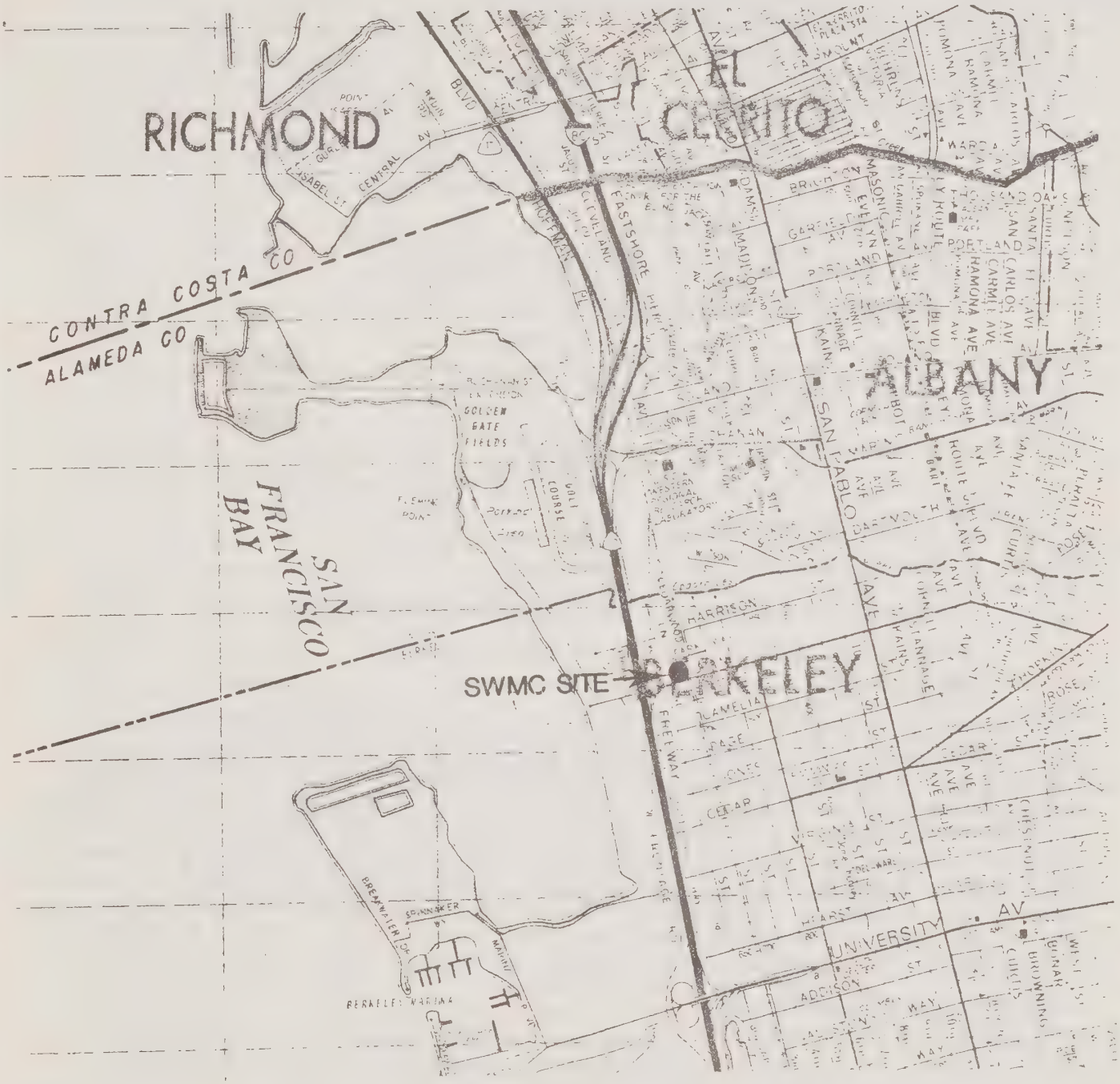


FIGURE II-2

LOCATION MAP

Source: Thomas maps

(Phase I Facilities)
The major elements of this phase would include:

- o A Recycling Center
- o A Storage Depot
- o A Receiving Facility
- o A Resource Recovery/Solid Waste Processing Facility
- o Several Modular Package Incinerators w/Appurtances
- o Steam Transmission Lines
- o Appropriate Air Pollution Control Equipment
- o Loading (Transfer) Facilities
- o Truck storage, washing, and fueling area

(Phase II Facilities)
Phase II facilities would include:

- o A Receiving Facility
- o A Resource Recovery/Solid Waste Processing Facility
- o Loading/ Transfer Facilities
- o A truck washing and fueling area
- o* Several Modular Package Incinerators w/Appurtances
- o* Appropriate Air Pollution Control Equipment
- o* Steam Transmission Lines

* *The Phase II proposed project facilities indicated by the asterick may or may not be included depending upon the proven environmental, engineering, and economic viability of these facilities demonstrated during Phase I. Although the manufacturer's claims for these units indicates they are capable of meeting California emission requirements this capability has not been demonstrated to the satisfaction of agencies charged with enforcement and monitoring of appropriate air quality regulations. It is conceivable that the modular package incinerators may not meet these requirements or would require additional air pollution control equipment that would render them economically infeasible. Should this occur, it is likely that they would be abandoned in Phase I of the proposed project.*

OPERATIONAL CHARACTERISTICS

(Phase I)
The proposed project would function in the following manner during Phase I.

Incoming solid waste to the SWMC would derive from two sources: 1) individual citizens, private haulers, small scavengers, etc., and 2) Berkeley's Municipal refuse collection system. Stream 1) refuse could go either directly to the Receiving Facility or to the Recycling Center.

The recycling center would function as a receiving area for recyclable materials brought in by the general public. It would include a "flea" market for the direct resale of reuseable items and an information center to disseminate waste

reduction and recycling information to the general public. Incoming materials would be separated and placed in labled bins or designated areas. These materials would include: glass, paper products, bi-metal containers, aluminum products, mixed metal scrap, reuseable wine bottles, and recoverable wood. Waste oil and grease would be received and temporarily stored in 55 gallon drums mounted on pallets to facilitate forklift handling. As sufficient quantities of individual materials accumulate, they would be consolidated with materials collected at the Storage Depot for shipment to market. Reuseable goods would be diverted to the Flea Market area for direct resale.

Current estimates are that 3,400 tons of glass, cans, and newspaper and 880 tons of cardboard, oil, grease, white goods, reuseable wine bottles, and flea market goods would be delivered to the Recycling Center annually. These materials are estimated to have a present market value of $109,000 annually (see Table II-1).

Those unclassified (and unsorted) solid waste materials arriving at the SWMC from private citizens, haulers, etc. together with the solid waste materials collected by the City's collection operation would be directed to the SWMC's Receiving Facility. This facility would be capable of accommodating up to 360 TPD during Phase I and could be expanded to meet Phase II needs.

The Receiving Facility consists of a 25 foot wide by 12 foot deep by 90 foot long receiving pit. Incoming refuse is dumped into the pit where it is precompacted and somewhat homogenized with a crawler or compactor type tractor. The tractor moves along the pit and pushes the refuse onto a horizontal metal pan conveyor for transport to the Resource Recovery/Solid Waste Processing Facility.

Within the Resource Recovery/Solid Waste Processing Facility, another inclined metal pan conveyor elevates the refuse and discharges it onto a trommel screen. The purpose of the trommel screen is to separate the light and heavy fractions and would result in separating out most of the metal cans, glass, wood, dirt, etc. from the waste stream. These separated materials, called the minus or heavy fraction, would drop to a horizontal rubber belt conveyor located beneath the trommel and are delivered to a magnetic removal system where the ferrous materials and bi-metal cans are removed for subsequent transfer to the storage area. The residue would proceed to the stationary compactor and then to the Loading Facility where it would be transported via haul vehicles to a designated landfill.

The plus or light fraction, consisting of lighter solid waste stream materials, would compose the feedstock for the modular package incinerators or, if they fail to meet emission requirements and are abandoned, would be transported to a regional energy recovery facility. Figure II-3 is a schematic diagram depicting the flow of materials through the proposed SWMC.

The modular incinerators, currently proposed for the SWMC, utilize a two-stage combustion principle which results in a very complete destruction of combustibles with less generation of particulate matter than that associated with conventional combustion systems. Material is fed into the primary chamber where combustion takes place slowly under starved air conditions. The gases then procede to a second chamber where excess air is introduced and a second combustion cycle is completed at very high temperature. This second cycle burns off most of the particulate matter and the hot flue gasses are passed over a heat exchanger to produce steam. Present plans are to market this steam for use by nearby

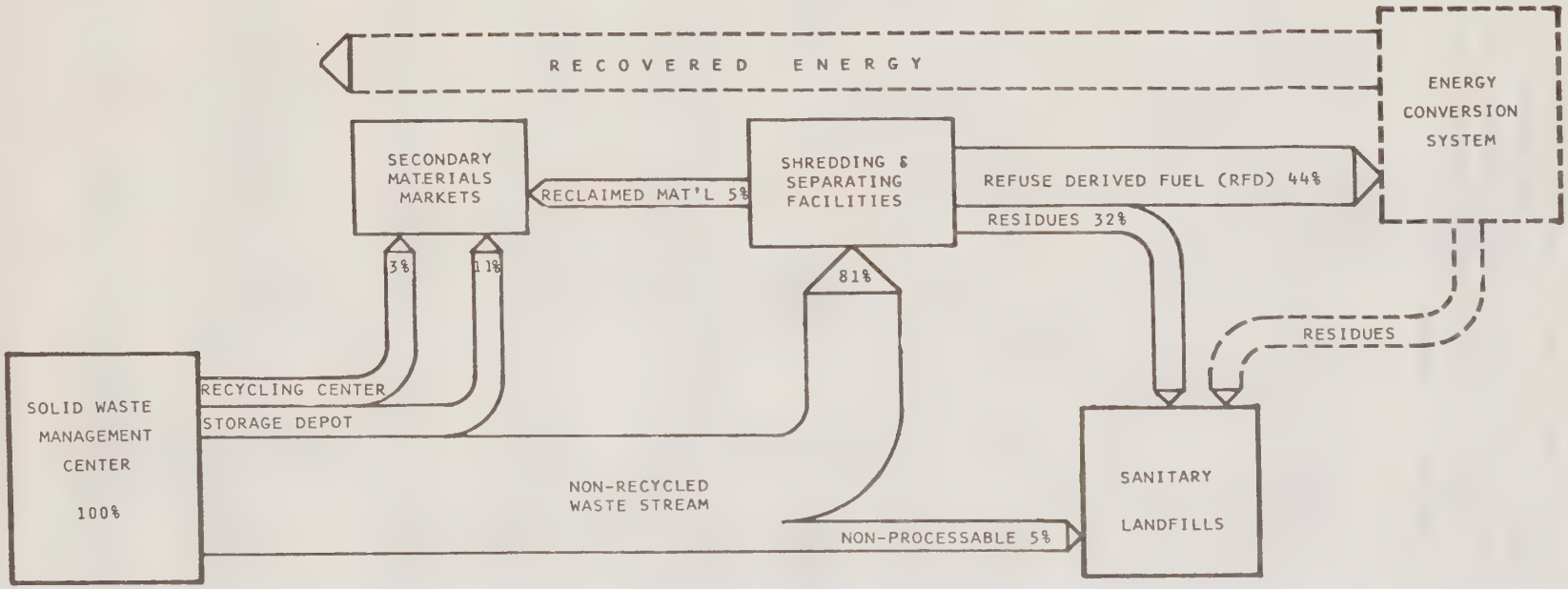
TABLE II-1

ESTIMATED RECYCLABLES AND REVENUES FROM RECYCLING CENTER

Material	Without Curbside Collection			With Curbside Collection*e		
	Market Value*c	Annual Quantity	Annual Revenue	Market Value*c	Annual Quantity*g	Annual Revenue
	$/Ton	Tons	$	$/Ton	Tons	$
Newspapers *a	23	1,800	$ 41,400	40	400	$ 16,000
Cardboard *a	12	465*b	5,580	40	None*f	—
Mixed Paper	—	*d	—	10	715*b	7,150
Ferrous Cans	20	180	3,600	20	None*f	—
Aluminum Cans	303	20	6,060	303	None*f	—
Glass *a	13	1,400	18,200	13	300	3,900
Wine Bottles	0.25/case	12,000 cases	3,000	0.25/case	12,000 cases	3,000
Waste Oil	40	115*b	4,600	40	115	4,600
Grease	120	150*b	18,000	120	150	18,000
White Goods	5	150*h	750	5	150	750
Flea Market	25/day	320 days/year	8,000	25/day	320 days/year	8,000
TOTAL		4,280	$ 109,190		1,830	$ 61,400

*a Figures include recyclables from neighboring communities.
*b Estimated at fifteen (15) percent of residential generation.
*c Values taken from Table 2-4.
*d Mixed waste paper recovery not recommended unless baling is implemented.
*e Baling assumed at Storage Depot for materials collected curbside.
*f These materials will be collected curbside.
*g Quantities shown are for materials collected only at the Recycling Center and do not include those collected curbside.
*h Estimate obtained from Mr. Farhner, Berkeley Landfill Company.

Source: Solid Waste Management Center, Phase I; City of Berkeley; Garretson, Elmendorf, Zinov, Reibin; June 1978



Note:

- INCLUDES ONLY THOSE RECOVERY PROGRAMS UNDERTAKEN AT THE GILMAN STREET SITE. THE IMPACT OF OFFSITE PROGRAMS SUCH AS PLANT DEBRIS COMPOSTING, OFFICE PAPER RECOVERY, AND CONCRETE AND ASPHALT REUSE ARE NOT INCLUDED.
- BASED ON 60% RESIDENTIAL AND 50% COMMERCIAL PARTICIPATION IN THE CURBSIDE COLLECTION PROGRAM OF SOURCE GROUPED MATERIALS.

Solid Waste Management Center
Materials Flow Diagram

Figure II-3

City of Berkeley
Department of Public Works

G·E·Z·R

industrial users.

The modular incinerators, proposed for the SWMC, are: factory built, highway shippable, and can be operated individually. This permits the assembly of modular steam generating facility from which individual incinerators can be taken out of service for repair or maintenance without interrupting the operation of the overall facility. Figure II-4 is a schematic diagram of a modular incinerator.

(Phase II)
Phase II operation of the proposed SWMC would be similar to that of Phase I with the following exceptions: 1) the Recycling Center and Flea Market facilities would likely be eliminated and the excess processed solid waste, produced from the expanded Resources Recovery/Solid Waste Processing Facility, would be transported to a Regional Energy Recovery Center (this analysis assumes that the modular incinerators perform as expected and are not eliminated in Phase II). 2) public access to Phase II SWMC facilities is likely to be curtailed (i.e. limited to City of Berkeley residents or prohibited altogether) owing to limitations of the site to accommodate anticipated traffic volumes.

CONSTRUCTION METHODS
Construction of Phase I facilities would commence with demolition of the existing on-site structures and various site preparation activities including leveling, grading, and installation of surface drainage facilities. The existing caustic lime pit would probably be excavated and the material removed for sale and subsequent distribution to agricultural interest for soil neutralization purposes.

Following these initial steps, construction would proceed in a normal fashion similar to that employed in the construction of a medium to large industrial building.

Construction of Phase II facilities would be undertaken in a manner which would permit continual use of most of the Phase I facilities while construction was taking place. These activities would include enlargement of the Receiving Facility, expansion of the Solid Waste Processing Facility, and expansion of the Transfer (loading and compaction) Facility.

It is possible that Phase II could also include expansion of the Energy Recovery Facilities if sufficient markets can be identified and additional modular incinerators could be operated within air quality emission standards.

CONSTRUCTION COSTS AND SCHEDULE*
Present estimates are that the Phase I facilities of the proposed project would require approximately $10 million 1978 dollars to construct and that construction could be complete within 18 months.

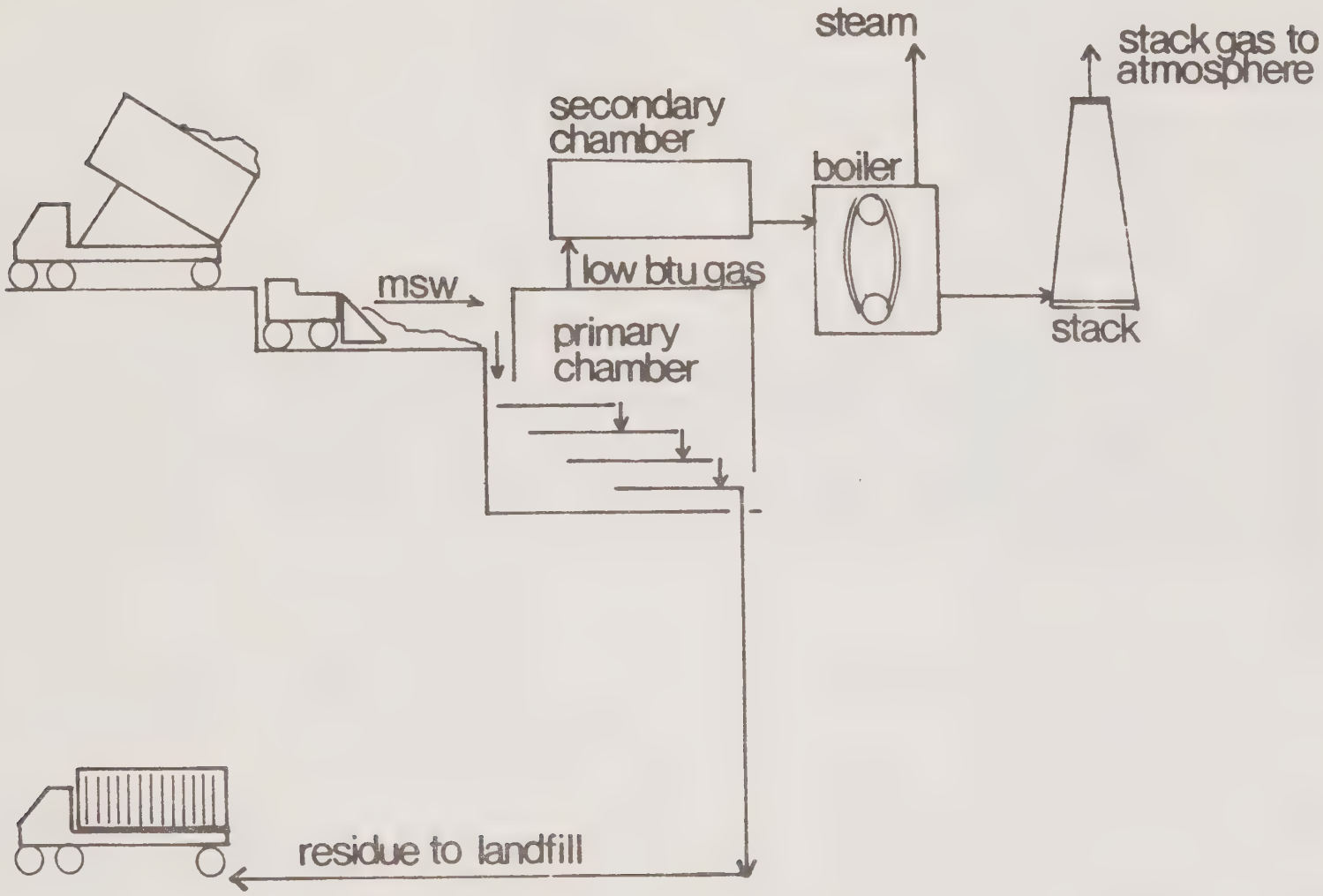
PERSONPOWER*
Phase I of the proposed project is expected to require 225 person-years to construct. The workers engaged would represent a variety of construction trades and average $20,000 annually in compensation. It is not known how many of these persons would be City of Berkeley residents.

OPERATIONAL COSTS*
The estimated annual operational costs, associated with Phase I facilities of the proposed project, are displayed by Table II-2.

ENERGY*
The energy consumption and production characteristics of the Phase I facilities

FIGURE II-4

PACKAGE INCINERATOR OPERATIONAL SCHEMATIC



Source: Solid Waste Management Center, Phase II; City of Berkeley; Garretson, Elemdorf, Zinov, Reibin; September 1978

Fixed Costs [a]	$1,300,000
Labor [b]	640,000
Maintenance [c]	150,000
Disposal [d]	440,000
Utilities [e]	70,000
TOTAL	$2,600,000

(a) Fixed costs based upon economic life of twenty (20) years @ 9.0% interest
(b) Labor costs based upon Table 5-4 Solid Waste Center Project Report; GEZR, 1978
(c) Maintenance cost includes: materials, replacement, and sinking fund
(d) Disposal cost based upon 80 round trip miles @ $.10 per ton/mile and $6.00 disposal costs (these values consider: labor, fuel, and maintenance for long-haul vehicles). Assumes ash disposal at Class II-I site.
(e) Utilities based on $.04 per KWH

TABLE II 2

BERKELEY SWMC

PROJECTED ANNUAL COSTS

Source: G-E-Z-R

of the proposed project are displayed by Table II-3.

* *No attempt has been made to estimate the construction cost and schedule, person-power requirements, operational cost, or energy characteristics of Phase II facilities of the proposed project.*

PERMITS REQUIRED

Utilization of the energy recovery component of the SWMC would require a permit for construction and/or operation of the package incinerators from the Bay Area Air Quality Management District. Additionally, the SWMC would require a finding of conformance to the County Plan by the Alameda County Solid Waste Management Authority and the State Solid Waste Management Board. Moreover, the City of Berkeley's Health Department (Local Enforcement Agency) would have to issue a Solid Waste Facilities Permit for the proposed project and a NPDES permit from the San Francisco RWQCB could be required if pre-treatment of SWMC effluents were required.

TABLE II-3

ENERGY CONSUMPTION AND PRODUCTION CHARACTERISTICS OF PROPOSED PROJECT

A. Energy Input (BTU Per Pound Refuse)	4,500
B. Energy Requirements and Losses (BTU Per Pound Refuse)	
• Refuse Fuel Processing	
• Electrical Requirements	--
• Loss of Combustibles	--
• Energy Conversion Facility	330
• Fossil Fuel and Electrical Requirements	
• Heat Loss	1,710
• Transportation	
• Residues	10
• Refuse Derived Fuel	--
Total	2,050
C. Net System Output (BTU Per Pound Refuse) (A minus B)	2,450
D. Energy Productivity Ratio (C divided by A)	54%

Source: Solid Waste Management Center, Phase Two; City of Berkeley; Garretson, Elemdorf, Zinov, Reibin; September 1978

CHAPTER III

ENVIRONMENTAL SETTING

TOPOGRAPHY

The study site is relatively flat and ranges in elevation from +5 to +14 feet mean sea level (City of Berkeley datum). It is devoid of distinguishing topographical features. Figure III-1 displays study area topography.

GEOLOGY

The study area lies on a sedimentary plain situated between San Francisco Bay and the foothills of the California Coastal Mountains. Bedrock, thought to be comprised of rocks of the Franciscan Group (marine deposits of sandstone and shale) underlies bay mud, alluvium, and artificial fill at the study site. The bay mud forms extensive tidal flats and rests on the Temescal (alluvial fan deposits of clayey gravel, clay sand, silt, and sand-silt mixtures), Merrit Sand (wind and water deposited fine grained silty and clayey sand with lenses of sandy clay and clay), and Alameda (continental and marine deposits of gravels, sands, silts, and clays with some shells and organic materials) formations. [Areal and Engineering Geology of the Oakland West Quadrangle; USGS Miscellaneous Map Series 1-239; 1957]

There is some evidence to suggest that the study area overlies an aquifer which extends from under the Bay to the foot of the Berkeley Hills. [Geologic Map of California - San Francisco Sheet; State of California, Department of Natural Resources (Division of Mines); 1976]

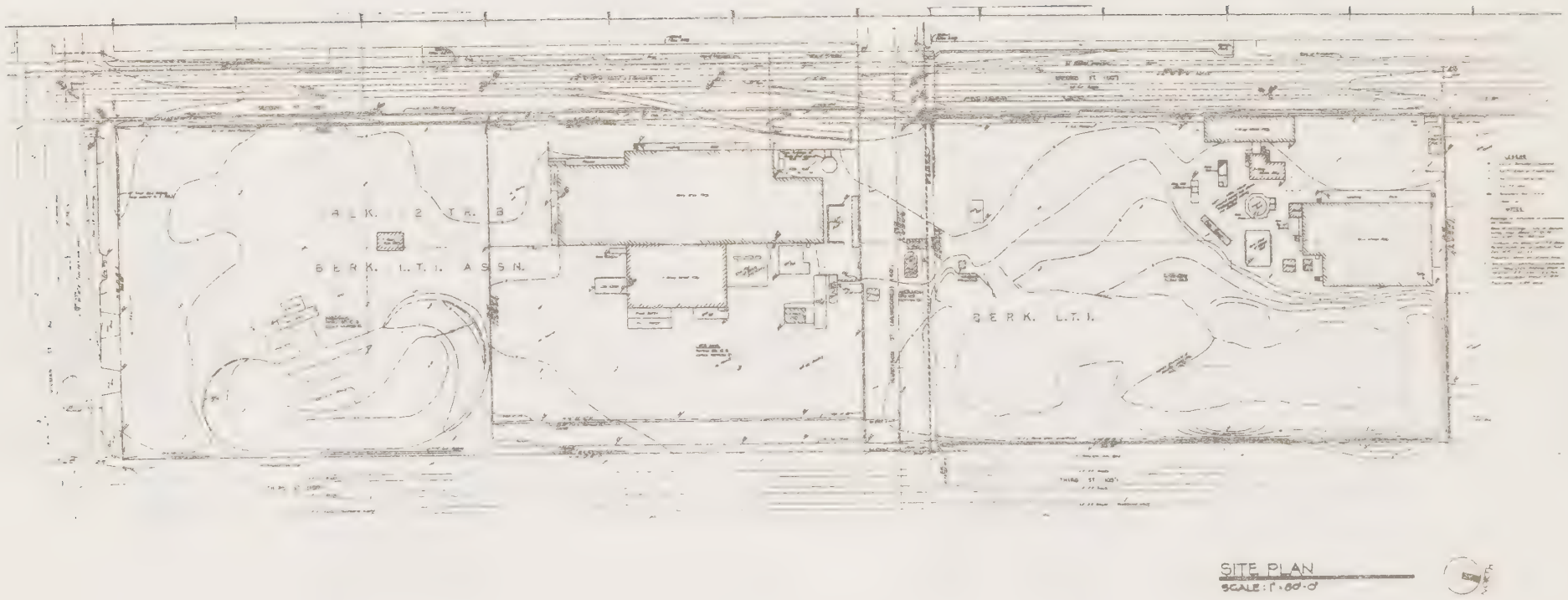
SEISMICITY

The study area is situated amidst three major active faults which are part of what is broadly termed the San Andreas Fault System: 1) The Hayward Fault, which extends from San Pablo Bay in the north to Hollister in the south, lies approximately 3 miles to the east of the study area and transects the City of Berkeley along the western slopes of the Berkeley Hills; 2) Further to the east (approximately 11 miles from the study area), lie extensions of the Calavaras Fault; and 3) Seventeen (17) miles to the west is the main branch of the San Andreas Fault. [Seismic Safety/Safety Element of the Berkeley Master Plan; City of Berkeley Comprehensive Planning Department; 1977] Figure III-2 displays study area fault locations.

These faults trend in a northwesterly direction and display right lateral shift movement (i.e. ground masses lying to the southwest of rift zones move in a northwesterly direction). Fault displacements can occur suddenly or may occur as the result of very slow movement (called tectonic creep) over time. Along rift zones that are poorly lubricated or faced with brittle material, slow tectonic creep may cause stresses to build up to a point which exceeds the capacity of rift zone materials. As rock masses shift to a position of lower stress (by shearing or snapping), the resultant sudden release of energy causes ground movement which is commonly known as an earthquake.

FIGURE III-1

STUDY AREA TOPOGRAPHY



Source: Garretson, Elmendorf, Zinov, Reibin; Architects and Engineers

FIGURE III-2

ACTIVE FAULTS IN SAN FRANCISCO BAY AREA

SOURCE: "Active Faults in the Southern Part of the San Francisco Bay Region," United States Geological Survey, 1971

GEOTECHNICAL HAZARDS

Several major seismic events have occurred along faults of the San Andreas Fault System during recorded times. Events exceeding an intensity of IX on the Modified Mercalli Scale (see Table III-1) occurred in 1836, 1838, 1865, 1868, and 1906. Seismic activity in 1836 and in 1838 resulted from movement along the Hayward Fault. The Seismic Safety/Safety Element of the Berkeley Master Plan predicts that the next major earthquake along the Hayward Fault will probably have a magnitude of 7+ on the Richter Scale and is expected to produce ground displacements (caused by right lateral movement with some minor vertical movement) of several feet. [Seismic Safety/Safety Element of the Berkeley Master Plan; City of Berkeley Comprehensive Planning Department; 1977]

Studies indicate that tectonic creep (evidenced by damage to water tunnels and culverts, cracking pavement, and offset curbs) is presently taking place at several locations along the Hayward Fault at an estimated rate of 0.1 to 0.15 feet in ten years. [Berkeley Facts; City of Berkeley Comprehensive Planning Department; 1971]

Seismic activity along any of the active faults in the San Andreas Fault System could result in the following primary geotechnical hazards at the study site: ground shaking, surface rupture or fissuring, ground lurching, or ground cracking. Ground shaking is the major cause of surface structural damage associated with strong motion events and occurs with greater intensity in water saturated alluvial sediments such as those which underlie the study area.

Additionally, strong seismic activity could induce secondary effects within the study area such as liquefaction or subsidence. Figure III-3 indicates potential study area seismic hazards.

Liquefaction occurs when unconsolidated water saturated sediments such as silt or sand are shaken (as during an earthquake), subsequently experience a loss of shear strength, and behave like liquids. Liquefaction hazards may be particularly serious if intense or prolonged seismic shaking occurs during the wet season when alluvial soils and artificial fill, which underlie the study area, are saturated. [Seismic Safety/Safety Element of the Berkeley Master Plan; City of Berkeley Comprehensive Planning Department; 1977]

Subsidence of the ground surface is a common phenomenon in alluvial soils such as those which predominate throughout the study area. Strong ground motion resulting from major earthquakes could cause rapid and uneven (or differential) local settlement of ground surfaces, resulting in damage to both surface and sub-surface structures.

In the event of major seismic activity along the Hayward Fault, disruption of the water, electric and gas distribution systems (which cross the Hayward Fault) could present potential tertiary hazards of fire, safety, and health risks.

FLOODPLAIN

The Seismic Safety/Safety Element of the Berkeley Master Plan identifies the study area as subject to inundation by the 100 year flood (a major flood that statistically should occur no more often than once in 100 years). [Seismic Safety/Safety Element of the Berkeley Master Plan; City of Berkeley Comprehensive Planning Department; 1977] Such flooding could result from: 1) heavy rains (potentially causing bay overflow, swelling of creeks, or overriding of curbs in hillside areas); 2) dam failure; or 3) seismic activity. The study area

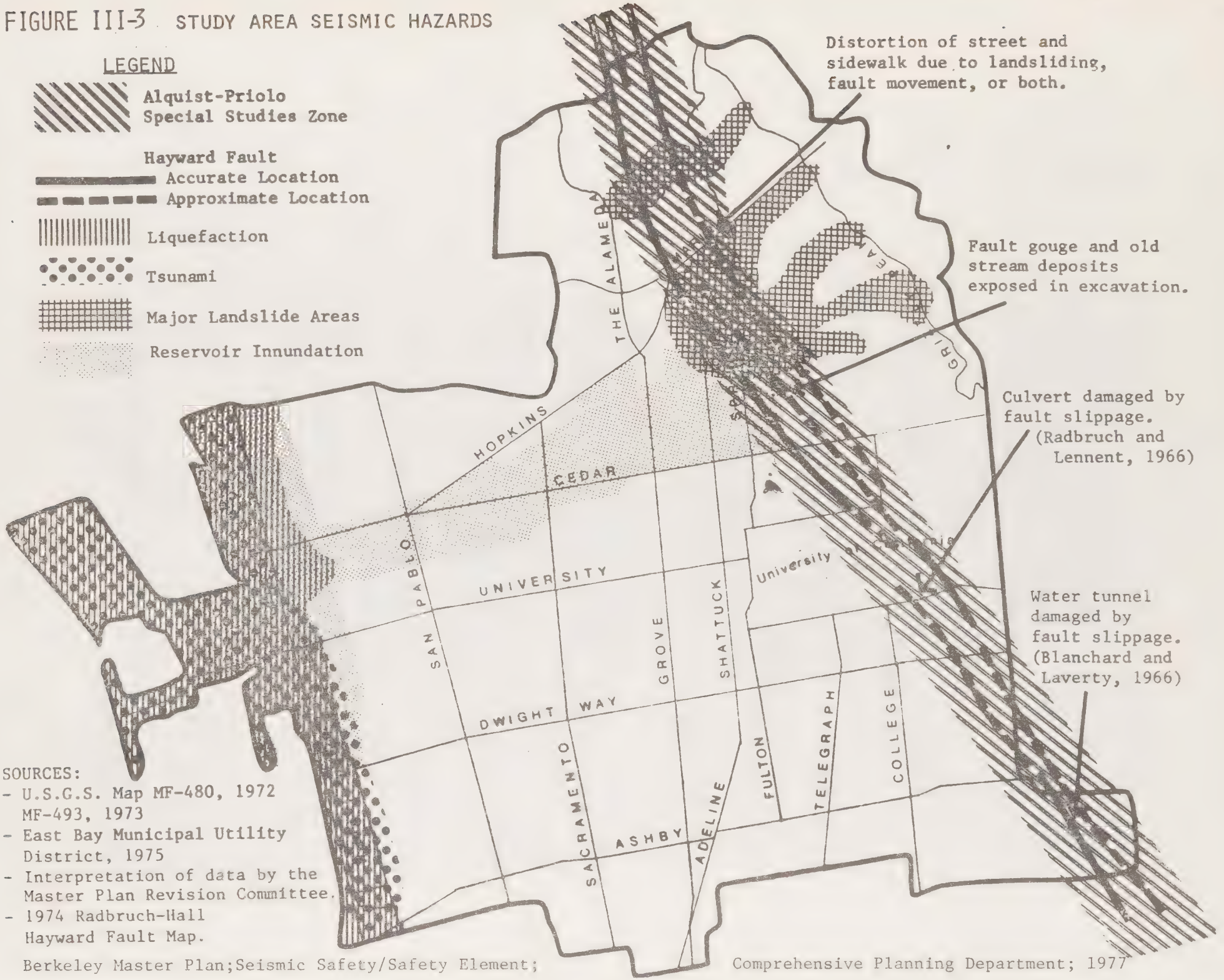
TABLE III-1

MODIFIED MERCALLI SCALE

Modified-Mercalli Intensity Scale *
(1931)

I	Detected only by sensitive instruments.
II	Felt by a few persons at rest, especially on upper floors; delicate suspended objects may swing.
III	Felt noticeably indoors but not always recognized as a quake; standing autos rock slightly, vibration like a passing truck.
IV	Felt indoors by many, outdoors by a few; at night some awaken; dishes, windows, doors disturbed; motor cars rock noticeably.
V	Felt by most people; some breakage of dishes, windows and plaster; disturbance of tall objects.
VI	Felt by all; many frightened and run outdoors; falling plaster and chimneys; damage small.
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos.
VIII	Panel walls thrown out of frames; fall of walls, monuments, chimneys; sand and mud ejected; drivers of autos disturbed.
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked, underground pipes broken.
X	Most masonry and frame structures destroyed; ground cracked; rails bent; landslides.
XI	Few structures remain standing, bridges destroyed; fissures in ground; pipes broken; landslides; rails bent.
XII	Damage total; waves seen on ground surface; lines of sight and level distorted; objects thrown up into air.

FIGURE III-3 STUDY AREA SEISMIC HAZARDS



SOURCES:
- U.S.G.S. Map MF-480, 1972 MF-493, 1973
- East Bay Municipal Utility District, 1975
- Interpretation of data by the Master Plan Revision Committee.
- 1974 Radbruch-Hall Hayward Fault Map.

Berkeley Master Plan;Seismic Safety/Safety Element; Comprehensive Planning Department; 1977

lies within the boundaries of water inundation (as determined by the East Bay Municipal Utilities District) in the event of dam failure or overflow at Berryman Reservoir (located directly over the Hayward Fault). [Seismic Safety/Safety Element of the Berkeley Master Plan; City of Berkeley Comprehensive Department of Planning; 1977] Figure III-4 delineates study area flood hazard zones.

Engineers from the Engineering Division of the City Public Works Department estimate that a 100 year flood would most likely surpass the capacity of the City's storm drainage system, which is currently designed for storms of 15 year intensity (with some of the more critical inlets accommodating storms of 25 year intensity). Most flooding would occur as "sheet flow" with depths less than several feet. The City's street system is expected to convey flood waters along natrual drainage paths to the waterfront area. [Seismic Safety/Safety Element of the Berkeley Master Plan; City of Berkeley Comprehensive Department of Planning; 1977 and City of Berkeley Environmental Resource Inventory; Comprehensive Planning Department; 1974]

HYDROLOGY

Studies by the State Department of Water Resources (logs from 10 wells within one-half mile of the Berkeley bayshore) have indicated the potential presence of water-bearing gravels (of useable groundwater quality) at depths ranging between 20 and 50 feet within the study area vicinity. [MacRostie, W.; State Department of Water Resources; Communication; February, 1977] The possibility or extent of groundwater contamination from leachate from caustic lime beds on a portion of the study area has not been determined.

SOILS

No site specific soil studies have been undertaken for purposes of this report. However, the study area is thought to be composed primarily of artificial fill and alluvium which is underlain by mud. [Areal and Engineering Geology of the Oakland West Quadrangle; United States Geological Survey Miscellaneous Map Series 1-239; 1975] The artificial fill layer (see Figure III-5) extends to a maximum depth of 25 feet and is composed of miscellaneous soils and sand. Permeability of the fill varies with its composition. The United States Geological Survey (USGS) has rated artificial fill material as generally possessing fair foundation capabilities, but suitable for light structures. The alluvial materials underlying the artificial fills are irregularly stratified, poorly consolidated deposits of mud, silt, sand, and gravel. Bay mud consists of clays and sandy silt, small lenses of sand, and shells and organic material and ranges in depth from a few inches to 85 feet along the Berkeley waterfront. Because bay mud consolidates under loads, it is rated by the USGS as poor for foundation conditions.

A portion of the study area (see Figure III-6) contains caustic lime beds that extend in thickness from approximately 6 to 15 feet. [Personal Communication; Michael J. Baumann; Berkeley Department of Public Works; October, 1978] Soil strength and foundation characteristics of the caustic lime bed area have not yet been determined.

VEGETATION AND WILDLIFE

The industrial activities and traffic surrounding the study area create an inhospitable and undesirable environment for natural biota. Consequently, plant and animal species are quite limited. Some extremely hardy "weed" species grow in pavement cracks and in patches of exposed soils. The only known study area wildlife are occasional rodents such as field mice and rats, and wandering cats and dogs. Due to the urban nature of the study site, a comprehensive survey

FIGURE III-4

STUDY AREA FLOOD HAZARD ZONES

100 YEAR FLOOD PRONE AREAS

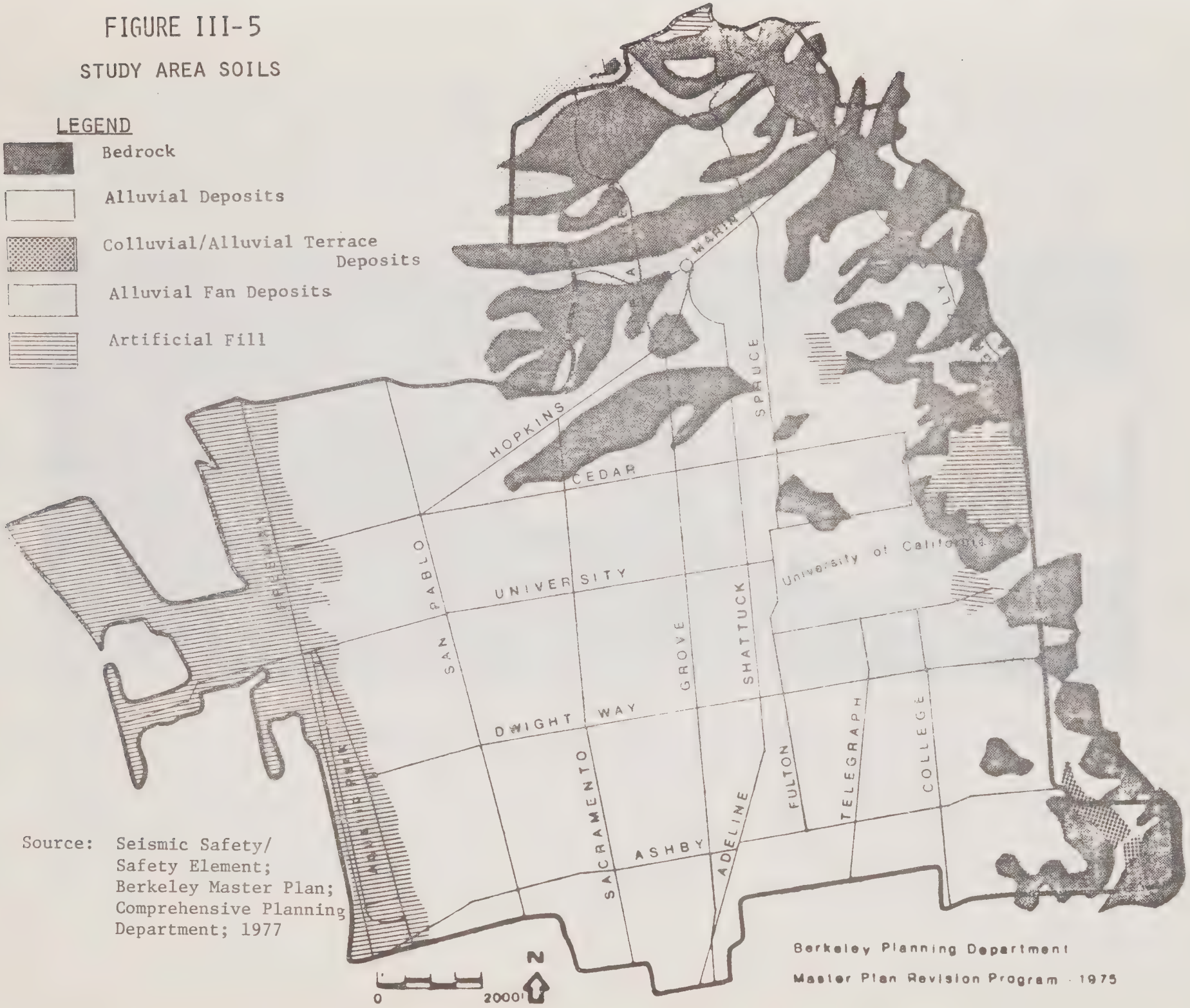
Source: Seismic Safety/Safety Element; Berkeley Master Plan; Comprehensive Planning Department; 1977

WATER RESERVOIR INUNDATION MAP

Source: Seismic Safety/Safety Element; City of Berkeley Master Plan; Comprehensive Planning Department; 1977 (from East Bay Municipal Utilities District,1975)

FIGURE III-5

STUDY AREA SOILS



Source: Seismic Safety/ Safety Element; Berkeley Master Plan; Comprehensive Planning Department; 1977

FIGURE III-6

STUDY AREA CAUSTIC LIME PONDS

Source: Solid Waste Management Center, Phase One; City of Berkeley; Garretson·Elmendorf·Zinov·Reibin, June; 1978

of the study area's flora and fauna was not undertaken for purposes of this report.

RARE AND ENDANGERED SPECIES

To date, there have been no reported sightings of any plant of or animal species classified by the California Department of Fish and Game or by the California Native Plant Society as rare or endangered, and none are thought to depend upon the site for habitat, food, shelter or stop-over.

CLIMATE

Study area climate is characterized by warm, dry summers; mild, wet winters; and frequent fog. Summer temperatures average in the low 60's, while mean winter temperatures range between 48 and 55°F. Temperatures exceed 90°F an average of three (3) times a year and reach below freezing approximately one (1) day per year. The highest recorded temperature is 106°F; the lowest is 25°F.

The average annual rainfall observed in Berkeley is 23.5 inches, 84% of which occurs during the period November through March. Intensities seldom exceed 2.5 inches during a 24 hour period. Rainfall at the study area is generally lower than that observed at higher elevation of the City.

Wind is one of the most significant climatic factors along the Berkeley waterfront. Situated directly east of the entrance to San Francisco Bay, the study area would normally be subject to brisk marine breezes (of low temperature and high humidity) which emanate from the south, southwest, and west most of the time. However, Interstate 80, located 1 block west of the study area, is constructed upon a berm (approximately 20 feet above the surface of Gilman Street) which acts as an effective buffer against the normal 7.2 mile an hour waterfront winds. This shielding effect makes the study area warm and comfortable when compared to lands west of the freeway. Table III-2 summarizes climatic data for the City of Berkeley and for the study area.

AIR QUALITY

Ambient air quality for the study area is measured by the Bay Area Air Quality Maintenance District's (BAAQMD) Richmond Monitoring Station, located at 1144 13th Street, Richmond, CA. approximately 7 miles from the study area. Sources of air pollution within the study area vicinity are transportation related (freeway traffic, heavy truck movement, and frequent train passage through the area) combined with minor stationary source contributions (from the surrounding light industries). Table III-3 displays ambient air quality for the study area for five (5) major pollutants (oxidant, carbon monoxide, nitrogen dioxide, sulfur dioxide, and total suspended particulates) which are monitored at the Richmond Station. The 20 foot high freeway berm upon which Interstate 80 is situated tends to shield the study area from the normally brisk marine breezes that disperse pollutants along other waterfront areas. This fact, in combination with close proximity to a major transportation corridor and slight easterly breezes (toward the study area) make it likely that carbon monoxide (and lead) levels at the study site may be somewhat higher than those detected by the Richmond Monitoring Station.

The topography of the San Francisco Bay Region, a large shallow basin surrounded by hills that taper into a series of sheltered valleys, creates a great potential for trapping and accumulating air pollutants. The Environmental Protection Agency (EPA) has designated the entire Bay Area, within which the study area

TABLE III-2

STUDY AREA CLIMATIC DATA

	TEMPERATURES (°F) 1/					RAINFALL (Inches) 2/				RELATIVE HUMIDITY 3/			Wind Direction 5/ and Speed (MPH)
	Mean Daily					Monthly			Greatest				
	Min.	Mean	Max	Highest	Lowest	Greatest	Mean	Least	Daily	4AM	Noon	4PM	
JANUARY	41.9	48.3	55.2	77	25	16.54	4.91	0.68	3.52	90%	60%	65%	N-6
FEBRUARY	44.6	51.1	57.9	80	29	10.85	4.31	0.22	4.75				W-6
MARCH	45.9	53.1	61.0	87	34	13.19	3.62	0.03	3.20				W-7
APRIL	48.4	55.3	63.8	91	36	6.72	1.48	0.01	2.06	80%	60%	60%	W-7
MAY	49.7	57.6	65.8	91	36	5.26	0.90	0.00	2.16				W-8
JUNE	52.3	60.7	69.1	101	42	1.24	0.19	0.00	1.04				W-8
JULY	53.7	61.4	69.4	97	42	0.44	0.02	0.00	0.20	(4)	55%	65%	W-10
AUGUST	54.1	61.3	69.0	92	46	0.90	0.04	0.00	0.38				W-10
SEPTEMBER	54.4	62.4	71.0	106	46	4.44	0.39	0.00	2.75				W-8
OCTOBER	51.4	60.3	69.0	99	39	5.80	1.26	0.00	3.22	60%	50%	60%	W-7
NOVEMBER	47.8	55.4	63.3	81	33	7.42	2.41	0.00	2.76				W-6
DECEMBER	43.4	49.8	56.5	76	26	12.63	4.11	0.65	3.24				N-6
Annual Average	49.0	56.4	64.3										
Annual Total							23.64						

Source. Weather Bureau Office for State Climatology, Environmental Science Services Administration, U.S. Department of Commerce from Berkeley Facts; Comprehensive Planning Department; City of Berkeley; 1971

1/ Based on 54 years of records.
2/ Based on 64 years of records.
3/ Data for Berkeley has been produced from extrapolations of Oakland and San Francisco readings for only the months of January, April, July, and October.
4/ Data is missing.
5/ Monthly averages of hourly readings.

TABLE III-3

AMBIENT AIR QUALITY
RICHMOND MONITORING STATION, 1974-1977

POLLUTANT	1974		1975		1976			1977		
	Max.	*	Max.	*	Max.	*	M**	Max.	*	M**
Oxidant (.8 pphm/1 hr- Federal Standard)	11	1	10	2	13	7	9	8	0	9
Carbon Monoxide (9 ppm/8 hours- Federal Standard)	7	0	6.2	0	6.8	0		5.2	0	
Nitrogen Dioxide (25 pphm/1 hour- State Standard)	15	0	20	0	23	0		16	0	
	Max.	+	Max.	+	Max.	+		Max.	+	
Sulfur Dioxide (.04 ppm/24 hours- State Standard)	.041	0	.04	.8	.013	0		.005	0	
	Mean	+	Mean	+	Mean	+		Mean	+	++
Total Suspended Particulates (100 g/m^3/24 hours- State Standard)	45	1.7	35	4.2	48	12		51	3.4	0

NOTES:

Max. = For oxidant and nitrogen dioxide, "Max." is the highest hourly average value expressed in parts per hundred million. For carbon monoxide, "Max." is the highest 8-hour average value in parts per million. For sulfur dioxide, "Max." is the highest 24-hour average value expressed in parts per million

* = Number of days listed (the strictest) ambient air quality standard was exceeded

M** = Average number of days oxidant standard was exceeded in 1970-1974 mean

Mean = Annual geometric mean in micrograms per cubic meter

\+ = Percent of observed days when State air quality standard was exceeded

++ = Percent of observed days when Federal air quality standard (150 g/m^3) was exceeded

Source: Bay Area Pollution Control District

lies, as an Air Quality Maintenance Area (an area which demonstrated difficulty in achieving and/or maintaining National Ambient Air Quality Standards for oxidant, carbon monoxide, and nitrogen dioxide; or one where projected growth and development in the 10 year period between 1975 and 1985 may interfere with the attainment or maintenance of these standards, once achieved).

Within the Bay Area, contaminants are emitted at a fairly constant rate throughout the year, yet pollution concentrations fluctuate widely (as a function of weather) from one day to the next and from season to season. Frequent atmospheric inversions (a reversal of normal atmospheric conditions in which relatively warm air aloft overrides a cooler dense air mass near the ground) tend to trap pollutants by inhibiting ventilation and vertical mixing of air. Subsidence inversions, which characterize California summers, are caused by downward vertical air movement (subsidence) which compresses and heats the air. These inversions persist within the Bay Area throughout the day and occur over 90% of the time.

Surface inversions, typical of winter, are caused by daytime radiation of surface air that becomes cooled at night through contact with the earth's cold surface. Winter radiation inversions occur on over 70% of Bay Area nights, but are usually destroyed by the sun's heating effect in the early afternoon, bringing rapid improvement in air quality.

Both types of inversions (subsidence and radiation) can occur at any time of the year, especially during the fall when both often combine to lead the year's heaviest and most persistent levels of pollution. Bay Area ventilation (determined by wind speed and inversion) is normally adequate to disperse most pollution, but poor ventilation during warm, sunny months fosters the development of photochemical oxidant, creating a May to October "smog season." The combination of local topography, climate, and proximity to a major regional transportation corridor, make smog conditions particularly acute within the study area.

The State of California Air Resources Board (through its State Air Quality Control Program) is responsible for the control and enforcement of standards for emissions from motor vehicles. Specifically, the State Air Resources Board has adopted measures which 1) establish emission standards for new cars sold in California; 2) compel automotive manufacturers to build in proper emissions controls; and 3) require manufacturers to test and certify emissions controls.

The Bay Area Air Quality Maintenance District (BAAQMD) is the local agency responsible for the control of pollution from stationary sources. Some of the BAAQMD's regulations directly control air pollution by limiting emissions of specific contaminants. Others indirectly control pollution by curtailing open burning, requiring industrial process modifications to meet direct controls, or by denying construction permits. In addition to its regulations, the District has the broad power to abate the emission of air contaminants that cause ".. "...injury, detriment, nuisance or annoyance to any considerable number of persons ...or which cause...injury or damage to business or property." (Health and Safety Code, Section 41700) A summary of the State Source Control Standards for the BAAPCD is presented in Table III-4.

LAND USE

The study area is situated within an industrial zone (zoned (M) under the Berkeley Zoning Ordinance) that extends from Interstate 80 eastward to San Pablo Avenue and from Ashby Avenue to the Albany City limits. Figure III-7 displays the

TABLE III-4

STATIONARY SOURCE CONTROL STANDARDS
BAY AREA AIR POLLUTION CONTROL DISTRICT

Pollutant	Standard
Particulates	Opacity--Ringelmann 1 Grain loading--0.15 gr/SCF 0.05 gr/SCF from incinerators>100 tons/day Process weight--up to 40 lbs/hr maximum No incandescent particles from emission point Soot blowing for fuel oil combustion controlled
Sulfur Dioxide	Emission limit--300 ppm or monitor at ground level Ground level--0.5 ppm for 3 min.; 0.04 ppm for 24 hours SO_3 grain loading--0.04 gr/SCF acid plants; 0.08 gr/SCF sulfur plants
Organic Gases	Emission limit-- 25 ppm carbonyls from incinerators 25 ppm hydrocarbons from incinerators
Hydrogen Sulfide	Ground level--0.06 ppm for 3 min average; 0.03 ppm for 1 hour per 24 hour period
Lead	Emission limit--15 lbs/day Ground level--1.0 $\mu g/m^3$ over background
Nitrogen Dioxide	Emission limit-- Size>250 million BTU 125 ppm for gas new or modified equipment 225 ppm for oil Size>1750 million BTU 175 ppm for gas all heat transfer equipment 300 ppm for oil
Odorous Compounds Trimethylamine Phenolic compounds Mercaptans Ammonia Dimethylsulfide	Emission limits 0.02 ppm* 5.0 ppm 0.2 ppm 5,000 ppm 0.1 ppm
Permits Required	Authority to Construct and Operate (permits) issued or denied to protect air quality. Suspended if regulations violated
Reactive Solvents	90% effective vapor recovery for bulk deliveries, storage at new service stations; for existing stations by 7-1-74; fuel pump controls for new and existing stations by 1-1-75

*Type A emission points. Type B emissions are one-half these levels.

FIGURE III-7

PROPOSED LAND USE
CITY OF BERKELEY

Source: Land Use Element; City of Berkeley Master Plan; Comprehensive Planning Department; 1977

proposed land use for the City of Berkeley, while Figure III-8 displays current zoning adjacent to the study area.

Immediately surrounding the study area are several light industries such as Clementina Ltd. (Contractor's Equipment Rental), Hawkins Company (which manufacturers traffic safety devices), Northwestern Equipment and Supply, Pacific Steel and Casting Company, O. L. King Company (automotive lubricant and wax manufacturers), a cafe, and a gas station.

The University of California at Berkeley owns approximately 5 acres near the study area (at Fourth and Harrison) which currently house a Youth Hostel and several small community gardens. The University plans to build a regional library storage facility on this land within the next five years. Additionally, a University housing area (with 1000 resident student families) lies immediately north of the study site. [Walker, Dorothy; University of California, Berkeley; Personal Communication; December 1978] In an effort to improve the City's tax base and to reduce industrial-residential land use conflicts (through relocation of industries), the policies of the Land Use Element of the Berkeley Master Plan encourage further development of the industrial area.

CIRCULATION

The study area is located between Interstate 80 (the Eastshore Freeway) and the Southern Pacific Rail lines. Figure III-9 displays the study area's circulation network. Gilman Street, which bounds the study area to the south and extends from Golden Gate Fields (one block west of the freeway) to Hopkins Street, is both a freeway and industrial area access route experiencing normal vehicular traffic and heavy truck movement serving the surrounding industries.

Berkeley's Department of Public Works (Division of Traffic Engineering) estimates 1977 twenty-four hour traffic volumes on Gilman Street, in the study area vicinity, at 11,000 vehicles (see Figure III-10). Traffic volumes and congestion are higher between 12 noon and 6 pm during the racing season at Golden Gate Fields (February through June).

To the west, the study area is bounded by Second Street which is a local access route upon which no recent traffic counts have been taken. Surrounding industrial properties and rail lines prevent vehicular access to the study site from the north and east.

Adjacent to the study site on the east are the Southern Pacific Railroad lines, which accommodate frequent daily train traffic. The Transportation Element of the Berkeley Master Plan indicates that the few freight trains operating along the Santa Fe right-of-way (which crosses Gilman Street further to the east) will soon be shifted to the Southern Pacific lines. [Transportation Element of the Berkeley Master Plan; City of Berkeley Comprehensive Department of Planning; 1977]

The Proposed Circulation Plan for the City of Berkeley, shown in Figure III-11, identifies Gilman as a major street. The policies of the Transportation Element encourage the reduction of dependence on the private automobile as a dominant mode of transportation. To these ends, the Plan has declared a need to increase public transit access to the industrial area and has also designated Gilman Street as a proposed bike route (see Figure III-12). The County of Alameda has requested funds from the Five-Year Federal-Aid Urban Program (fiscal year 1979-80 through fiscal year 1983-84) for the construction of bicycle/pedestrian facilities, to provide marina access, across Interstate 80 along University

FIGURE III-8

STUDY AREA ZONING MAP

LEGEND

O-R	Office-Residential	R-1	Single Family Residential
C-1	Limited Commercial	R-1A	Limited Two-Family Residential
C-2	Central Commercial	R-2	Restricted Two-Family Residential
C-3	General Commercial	R-2A	Restricted Multiple-Family Residential
SI	Special Industrial	R-3	Multiple-Family Residential
M	Manufacturing	R-4	Multiple-Family Residential
U	Unclassified	R-5	High Density Residential
-H	Combined Hillside		
-PS	Combined Planned Shopping		

Source: City of Berkeley Comprehensive Planning Department

Legend

- Major Street
- Collector Street
- Scenic Route
- Area Under Study
- Freeway and Interchange
- Rail Lines
- B.A.R.T.D. Station

FIGURE III-9

STUDY AREA
CIRCULATION

Base map: Berkeley Planning Department

FIGURE III-10

1977 24-HOUR TRAFFIC VOLUMES
CITY OF BERKELEY

Herman A. Sinemus, Traffic Engineer

* Data obtained from 1976 Caltrans Traffic Volume

Source: Traffic Engineering Division; Department of Transportation; City of Berkeley; 1977

FIGURE III-11

PROPOSED CIRCULATION PLAN
CITY OF BERKELEY

Source: Transportation Element; Berkeley Master Plan; Comprehensive Planning Department; Berkeley, California; 1977

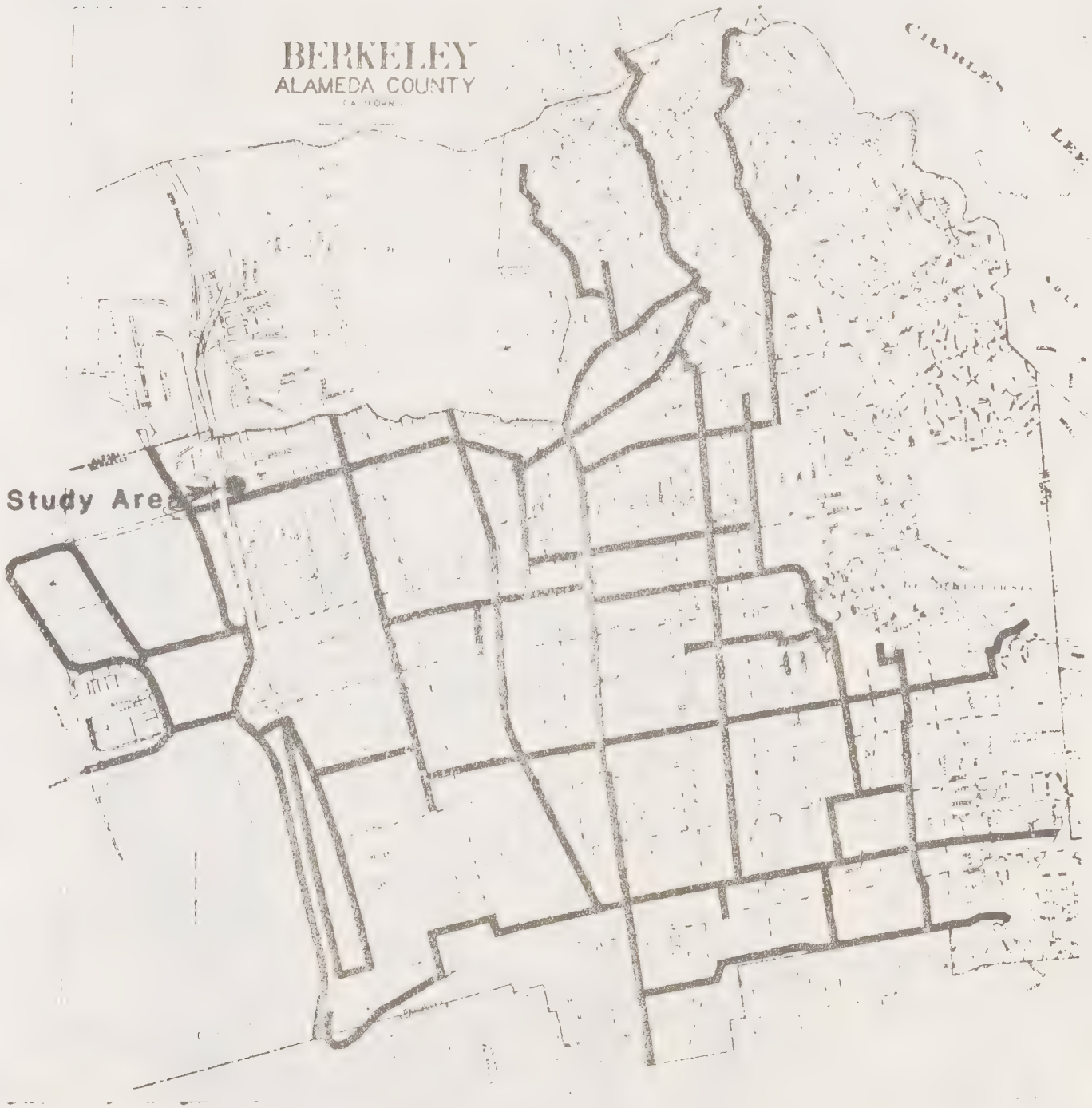


FIGURE III-12

BERKELEY

BIKEWAYS NETWORK

Source: Berkeley Master Plan

Avenue. [Oakes, Roy; Berkeley Department of Public Works; Personal Communication; November 1978] This action is expected to result in a shift of most bicycle and pedestrian use from Gilman Street (currently the only marina access route) to University Avenue. As a means of easing conflicts between industrial and residential vehicular use west of San Pablo Avenue, the Transportation Element also proposes additional collector streets in the industrial area along Fourth Street.

NOISE

Noise within the study area emanates from the surrounding industrial activity (i.e. heavy equipment, engines, air tools, welding equipment, and steel chippers) and the transportation sector. Increased traffic during the racing season at Golden Gate Fields adds to traffic generated noise levels. Additionally, frequent train traffic along the Southern Pacific Railroad alignement is a major study area noise generator. The planned shifting of several freight trains from the Santa Fe Rail lines to the Southern Pacific lines is expected to increase the duration, although not the magnitude, of study area noise levels. [Personal Communication; Herman Sinemus, Division of Traffic Engineering; Department of Public Works; October 1978]

Figure III-13 is a noise contour map from the Noise Element of the Berkeley Master Plan (compiled from 1975 studies by McDonnell/Douglass Corporation) which indicates an average value of L_{dn} 80 for the study area vicinity. L_{dn}, or Day-Night Average Sound Level, is a measurement of noise based upon human reaction to the cumulative exposure to noise over a 24-hour period and is weighted to take into account the greater annoyance value of nighttime noise. The Noise Element states that commercial and industrial areas are adversely noise impacted with values of L_{dn} 75 or greater and recommends values not to exceed L_{dn} 65 for schools, parks, hospitals, and residential areas. Figure III-14 displays noise impacted zones for the City of Berkeley projected to 1980. Figure III-15 displays yearly average equivalent sound levels requisite to protect public health and welfare (with an adequate margin of safety).

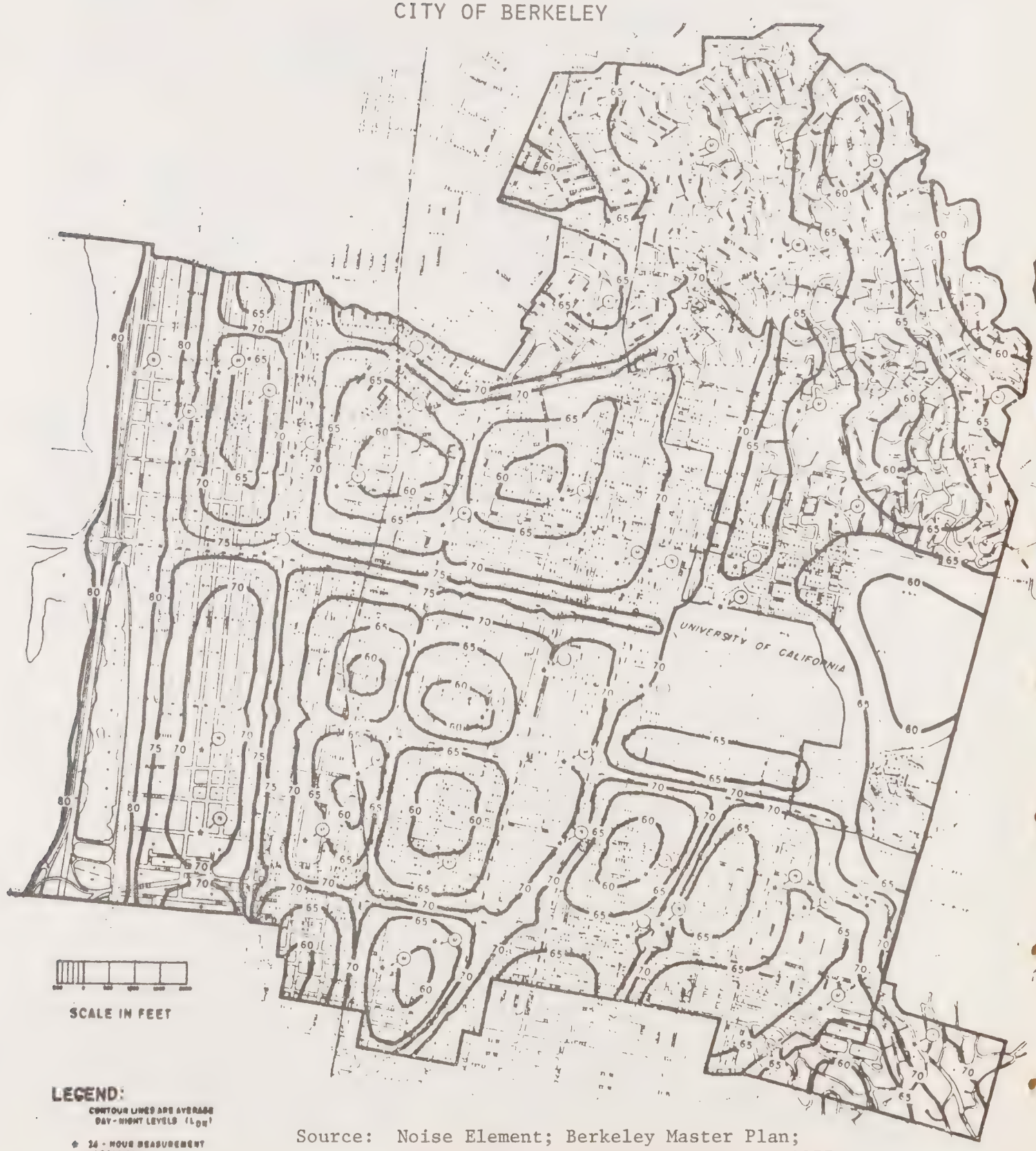
Stated policies of the Noise Element of the Berkeley Master Plan include: establishing standards (and incorporating them into local ordinances), in accordance with the California Administrative Code, for interior and exterior noise levels; establishing acceptable and unacceptable land use compatibility for noise environments (see Figure III-16); providing visually pleasing sound attenuation devices for State and Interstate routes (including Interstate 80); and establishing noise emission limits for City public works projects. [Noise Element of the Berkeley Master Plan; City of Berkeley Comprehensive Planning Department; 1977]

DEMOGRAPHY

The U.S. Census of Population and Housing indicates a 1970 Berkeley population of 114,091. [U.S. Census of Population and Housing; San Francisco-Oakland, California; U.S. Department of Commerce; 1970] This population is made up of 62.2% White, 23.4% Black, 5.5% Spanish heritage, and 8.8% Asian segments. The student population of the University of California at Berkeley (UCB) living in Berkeley represents about 17.5% of the total population. [The People of Berkeley; Who They Are; Demographic Profile; Housing Series #1; Berkeley Planning Department; January 1973] The City-wide annual mean income of families and unrelated individuals is $12,362. [Income and Demographic Profiles for Social Planning Areas; Comprehensive Planning Department; City of Berkeley; September 1976]

FIGURE III-13

NOISE CONTOUR MAP
1975
CITY OF BERKELEY



Source: Noise Element; Berkeley Master Plan; Comprehensive Planning Department; 1977

FIGURE III-14

PROJECTED NOISE IMPACTED ZONES TO 1980

Source: Noise Element; Berkeley Master Plan; Comprehensive Planning Department; 1977

FIGURE III-15

YEARLY AVERAGE EQUIVALENT SOUND LEVELS REQUISITE TO PROTECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY

	Measure	Indoor: Activity Interference	Indoor: Hearing Loss Consideration	Indoor: To protect against both effects (b)	Outdoor: Activity Interference	Outdoor: Hearing Loss Consideration	Outdoor: To protect against both effects (b)
Residential with outside space and Farm Residences	L_{dn}	45		45	55		55
	$L_{eq(24)}$		70			70	
Residential with no outside Space	L_{dn}	45		45			
	$L_{eq(24)}$		70				
Commercial	$L_{eq(24)}$	(a)	70	70(c)	(a)	70	70(c)
Inside Transportation	$L_{eq(24)}$ $L_{eq(24)}$	(a)	70	(a)			
Industrial	$L_{eq(24)(d)}$	(a)	70	70 (c)	(a)	70	70 (c)
Hospitals	L_{dn}	45		45	55		55
	$L_{eq(24)}$		70			70	
Educational	$L_{eq(24)}$ $L_{eq(24)(d)}$	45	70	45	55	70	55
Recreational areas	$L_{eq(24)}$	(a)	70	70 (c)	(a)	70	70(c)
Farm Land and General Unpopulated Land	$L_{eq(24)}$				(a)	70	70(c)

Explanation of identified level for hearing loss: The exposure period which results in hearing loss at the identified level is a period of 40 years.

Code:

a. Since different types of activities appear to be associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity. (See Figure D-2 for noise levels as a function of distance which allow satisfactory communication.)

b. Based on lowest level.

c. Based only on hearing loss.

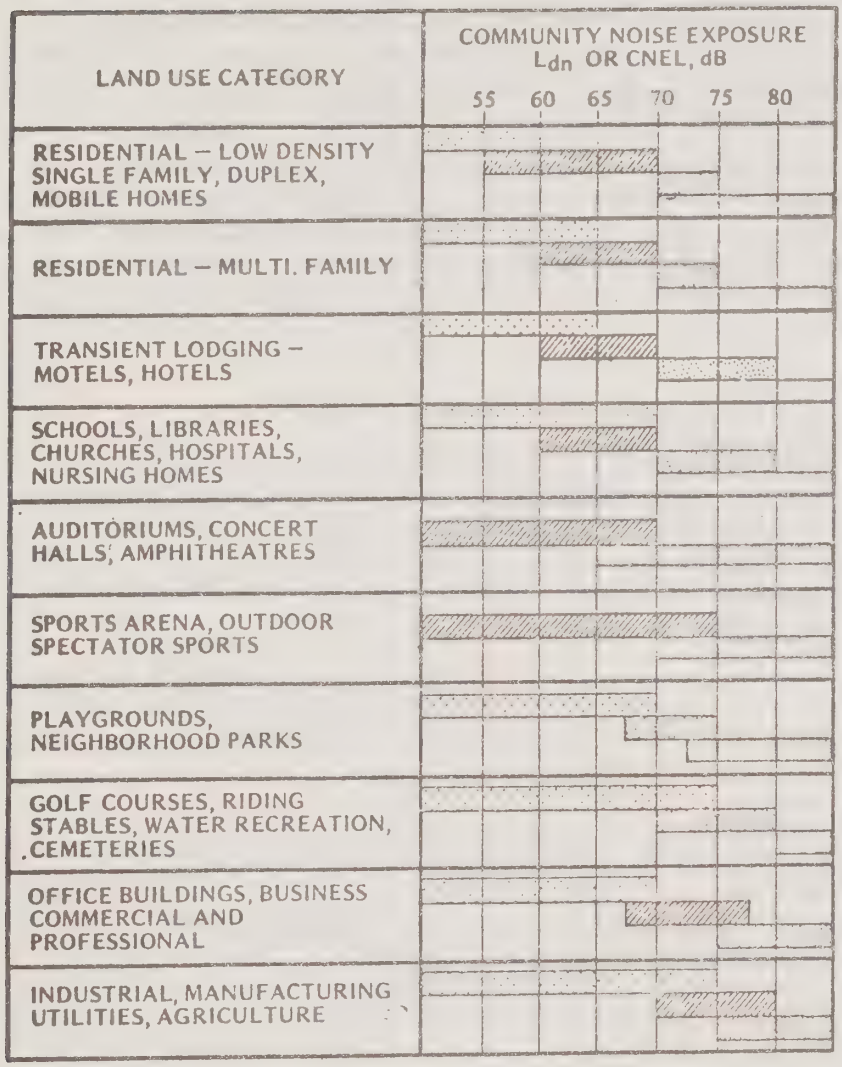
d. An $L_{eq(8)}$ of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average, i.e., no greater than an L_{eq} of 60 dB.

*Refers to energy rather than arithmetic averages.

Source: Environmental Resources Inventory; City of Berkeley; Comprehensive Planning Department; 1974

FIGURE III-16

LAND USE COMPATABILITY FOR COMMUNITY NOISE ENVIRONMENTS



INTERPRETATION

NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE

New construction or development should generally not be undertaken.

A. NORMALIZED NOISE EXPOSURE INFORMATION DESIRED

Where sufficient data exists, evaluate land use suitability with respect to a "normalized" value of CNEL or L_{dn}. Normalized values are obtained by adding or subtracting the constants described in Table 1 to the measured or calculated value of CNEL or L_{dn}.

B. NOISE SOURCE CHARACTERISTICS

The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in Community Noise Exposure Areas greater than 65 dB should be discouraged and considered located within normally unacceptable areas.

C. SUITABLE INTERIOR ENVIRONMENTS

One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL or L_{dn}. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. ACCEPTABLE OUTDOOR ENVIRONMENTS

Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. When this is the case, more restrictive standards for land use compatibility, typically below the maximum considered "normally acceptable" for that land use category, may be appropriate.

Source: Noise Element; Berkeley Master Plan; Comprehensive Planning Department; City of Berkeley; 1977

The study area lies within the West Berkeley Planning Area of the Comprehensive Planning Department's Income and Demographic Profiles for Social Planning Areas [Ibid.] The racial composition of this area differs significantly from the City-wide mix, with 56.1% Black, 31.7% White, 6.5% Spanish, and 5.7% Asian. This population has a significant number of low income families (27.7%) and families headed by females (23.5%), lower than average proportion of college educated adults (33.3%) and higher than average residential stability. [Ibid.]

Between 1960 and 1970 the Berkeley population increased approximately 2.5% (or 2,800 persons). This compares with a population increase throughout the Bay region of approximately 7.5%. However, of the major population centers of the region (1960 populations of 100,000 or more), Berkeley alone registered an increase. [U.S. Census of Population and Housing; San Francisco-Oakland California; U.S. Department of Commerce; 1970].

PUBLIC FACILITIES AND UTILITIES

(Existing Collection/Disposal Practices)
The City of Berkeley currently operates a fleet of 18 refuse collection trucks capable of collecting 16 to 25 cubic yards of refuse. These vehicles are manned by three-men crews and provide once weekly service to commercial subscribers. The City of Berkeley refuse collection system handles approximately 871 tons of refuse per 5.2 day work week and employs approximately 66 persons in supervisory, field, and office capacities.

Collected refuse is unclassified (i.e. unseparated) and a charge of $3.20 per month for the equivalent of a 32 gallon can is added to the tax bill of the residence. Special pick-up service is available for large bulky items and yard debris.

Collected Refuse is transported to the Berkeley Landfill which is situated atop former bay tidelands along the City's western shoreline north of Spinnaker Way. Received refuse is distributed, compacted, and covered with a layer of soil materials in accordance with modern sanitary landfilling practices. The Berkeley Landfill is classisied as a Class II-2 sanitary landfill. This facility employs between 6 and 8 personnel (equipment operators, cashiers, night watchmen, and administrators). [Farner, James; Berkeley Landfill Company; Personal Communication; December 1978]

In addition to the City's Refuse collection system, several community recycling organizations operate collection services for city residents. Additionally, private haulers, paper brokers, scavengers, and salvagers collect and recycle portions of the City's solid waste stream.

Per capita solid waste generation estimates for Berkeley, are presently 3.9 lbs daily and are projected to be 4.3 lbs/day in 1985 and 4.7 lbs/day in 1995. [Medium-and Long-Term Solid Waste Facilities Plan; Alameda County Solid Waste Management Authority, October 1978] However, a substantial portion of Berkeley's solid waste is recycled and therefore does not enter the refuse collection system. Estimates are that up to 11.0% of the Berkeley generated solid waste stream is recycled.

(Water)
Water is provided to the City of Berkeley (and to the study area) by the East Bay Municipal Utilities District (EBMUD), which imports water from the Mokelumne River watershed. At the current rate of growth in District per capita water

consumption, the Mokelumne water source (which provides 95% of the District's water, with 5% supplied by local run-off) will be sufficient to meet demand until the mid-1980's. [Initial Environmental Impact Study; Negative Declaration for the Berkeley Master Plan; Berkeley Planning Commission; City of Berkeley Comprehensive Planning Department, October, 1976]

(Sewage)
Special District 1 (SD 1), set up under the jurisdiction of EBMUD, handles wastewater treatment for 6 East Bay Cities, of which Berkeley is one. An EBUMD 48" interceptor and an 8" City collector line run adjacent to the study area. At the SD 1 Plant, located on the Bay at West Grand Avenue in Oakland, wastewater undergoes primary treatment and subsequent disinfection (by chlorination) prior to discharge into San Francisco Bay. Secondary treatment facilities that enable SD 1 to meet the latest Federal Standards are currently in operation.

(Energy)
Gas and electricity are supplied to the study area (and the entire City of Berkeley) by Pacific Gas and Electric Company (PG&E). All electric power for distribution and sale by PG&E in Berkeley is brought into the City from distribution line networks. Eight distribution substations located throughout the City transform voltage from 12KV to 4KV for distribution to local areas. PG&E presently has plans to construct additional electric transformer capacity and underground feeder cables. [City of Berkeley Environmental Resources Inventory; City of Berkeley Comprehensive Planning Department; October 1974]

AFFECTED PLANNING AND REGULATORY AGENCIES

(Association of Bay Area Governments)
The Association of Bay Area Governments (ABAG) was formed by a joint powers agreement among many of the City and County governments of the Bay Area in 1961. ABAG is responsible for the coordination of regional planning, particularly as it relates to Federal and State grant-in-aid programs. In this capacity, ABAG maintains an area-wide clearinghouse (as authorized by the Office of Management and Budget Circular A-95) and assures that proper agencies are notified of proposals for grant funding submitted by various governmental units which may have an affect on their programs. It is anticipated that a portion of the proposed project would be grant fundable.

In addition to its clearinghouse functions, ABAG was selected to prepare an environmental management plan for the San Francisco Bay Region by the Environmental Protection Agency (EPA). The plan, which was prepared with the cooperation and assistance of several Federal and State agencies has several elements one of which relates to the Management of Regional Solid Waste. The Solid Waste Management Plan consists of eighteen policies which are presented in the following narrative:

- *The regional solid waste management plan should primarily be based on the County solid waste management plans: primary responsibility for adequate solid waste management shall rest with local governments*
- *Regional solid waste management planning should be coordinated with State and local planning and be an integral part of areawide environmental management planning*

- Regional or subregional resource conservation and recovery programs should be consistent with the regional solid waste management plan and the environmental management plan, and should focus on multi-jurisdictional projects for waste reduction and recovery of materials and energy from solid waste
- All solid waste disposal sites must be situated, designed and operated to provide protection to the surface and ground water quality and the natural environment as well as protection of public health and safety
- Where possible, incorporate methods into the existing permit process for solid waste management facilities that will make the process more efficient and convenient and that will facilitate early discussion of project-related issues
- Agencies' existing regulations, including time limits for review and comments, should be clarified and additional ones should be adopted where necessary to formalize procedures used in processing of or commenting on applications
- Permit coordination procedures for solid waste management activities should be integrated with other coordination projects in the future, as appropriate
- Public education programs are essential to promote awareness of need for waste reduction
- Federal and State governments should adopt legislative and administrative changes which promote waste reduction
- Facilitate regionwide cooperation in developing stable, adequate markets for secondary materials
- Federal and State governments should adopt legislative and administrative changes to improve competitive positions of secondary materials and products containing secondary materials
- All levels of government should encourage development of source separation programs
- Adequate planning for hazardous waste management requires accurate data
- Waste reduction, source separation, and recovery of hazardous industrial waste should be promoted in interest of limiting land disposal
- Regulations should ensure safe and proper handling of hazardous waste

- *Future Class I disposal sites and facilities should be located so that they do not have adverse affects on human health and safety, air and water quality, wildlife, critical environmental resources and urbanized areas*
- *A regional plan for long-term wastewater solids management should be prepared and updated*
- *Facilities for wastewater solids management should be constructed in conformance with the regional wastewater solids plan and the environmental management plan.*

(Bay Area Air Quality Maintenance District)
The State Air Quality Control Program is administered by the Air Resources Board in Sacramento. California's Air Quality Control Implementation Plan consists of twelve parts. Part 1, is the State General Plan, which deals with the aspects of air pollution and control that are common to all or several of the State's eleven air basins. The remaining eleven parts are specific basin plans.

Implementation of the San Francisco Bay Area Implementation Plan is under the jurisdiction of the Bay Area Air Quality Maintenance District (BAAQMD) which has primary responsibility for the control of stationary source emissions within its jurisdictional boundaries. In this role, the BAAQMD would have to issue a permit for construction and a permit for operation of the incinerator component of the proposed project and periodically monitor the performance of the incinerators to insure that emission standards are not exceeded.

(State Solid Waste Management Board)
The State Solid Waste Management Board was established by the Nejedly-Z'berg-Dills Solid Waste Management and Resource Recovery Act of 1972. This legislation recognized the need for a state-wide program to establish and maintain a high standard of performance in the areas of collection, transfer, and disposal of soild wastes, and to emphasize resource recovery operations as a means of conserving our natural resources. The law directed the Board to establish and maintain a comprehensive state solid waste management and resources recovery policy and related programs in concert with environmental health programs of the State Department of Health.

The enabling legislation is specific in its directions as to the manner and mechanism to be used in the implementation of its stated objectives. California's 58 counties are given the responsibility to prepare individual solid waste management plans that have the concurrence of a majority of the cities containing the majority of the population within the county. The State Board was mandated to: 1) establish state-wide solid waste management policies; 2) adopt minimum standards; 3) develop planning guidelines upon which county solid waste management plans are to be based; 4) adopt a resource recovery program; 5) submit a report on improved methods of controlling and reducing the problems of litter; 6) study alternative methods of providing financial assistance to local agencies; 7)render technical assistance; 8) implement a public information program; 9) conduct and coordinate studies on new solid waste handling methods; and 10) implement a statewide solid waste management information system.

The Board has two specific statutory responsibilities over solid waste facilities: 1) A determination of conformance to the County Solid Waste Plan, and 2) concurance

in the issuance of a Solid Waste Facility Permit issued by Berkeley's Department of Health (Local Enforcement Agency).

(Alameda County Solid Waste Management Authority)
Pursuant to the mandate contained in Title 7.3 Section 66700 et. seq., of the California Administrative Code, the Alameda County Board of Supervisors designated the County Planning Commission as the appropriate agency to handle solid waste management planning for Alameda County in June, 1972.

To facilitate the required approval of the cities within the County, the Alameda County Solid Waste Management Plan Interim Council, composed of one representative each of: the county; cities within the county; and the Community Service Districts of Castro Valley, Oro Loma, and Valley was formed in Feburary 1976. The Interim Council was specifically charged with drafting a Joint Exercise of Powers Agreement to establish an agency to implement and be a part of the Solid Waste Management Plan. This agency is the Alameda County Solid Waste Management Authority.

The State Policy for solid waste management established a 20 year planning horizon for all waste disposal facilities in local plans. Regardless of the level of resource and energy recovery in Alameda County, adequate collection, transport, and disposal facilities must be provided. It is the policy and goal of the Solid Waste Management Authority of Alameda County to strive for a maximum amount of technically and economically feasible resource and energy recovery from solid wastes.

The County Solid Waste Management Plan consists of three documents: 1) Solid Waste Management Plan for Alameda County (Policies Plan), adopted by the Alameda County Board of Supervisors, May 18, 1976; 2) Solid Waste Management Facilities Plan for Alameda County (Short-Term Plan), adopted by Alameda County Solid Waste Management Authority, March 16, 1977; and 3) Medium- and Long-Term Solid Waste Facilities Plan adopted by the Alameda County Solid Waste Management Authority, October 5, 1978. All facilities proposed for development in the County must be reviewed by the Authority for conformance to the Countywide Plan.

CHAPTER IV

ENVIRONMENTAL IMPACTS

The environmental impacts associated with the proposed project are two-fold: those related to construction, and those associated with the operation of the proposed facility. Moreover, owing to the phased nature of the project, these impacts will have differing levels of intensity, and periods of detection.

CONSTRUCTION IMPACTS

Phase I construction activities would include demolition of existing site structures, various site preparation activities, and erection of new facilities. The environmental impacts of these activities would be typical of those normally associated with medium to heavy construction in an urban industrial area and are expected to: be temporary in nature, of relatively short-term and, for the most part, detectable only within close proximity of the construction zone. Phase II construction activities would involve expansion of Phase I facilities and possibly relocation or elimination of some Phase I facilities such as the recycling area and the flea market. Additionally, off-site improvements to the nearby circulation system will be required in Phase II.

The construction impacts associated with both Phases, would include:

(Noise)

Construction of the proposed project would include the use of mechanized demolition and construction equipment having the potential to slightly elevate ambient noise levels on and adjacent to the construction site. Noise levels are likely to be most intense during the demolition and site preparation activities associated with Phase I of the proposed project. Figure IV-1 displays typical noise ranges associated with construction equipment some of which is likely to be used for the proposed project. The remainder of Phase I construction activities and the Phase II construction activities are expected to be significantly less intense noise generators than the demolition and site preparation activities associated with Phase I.

(Air Quality)

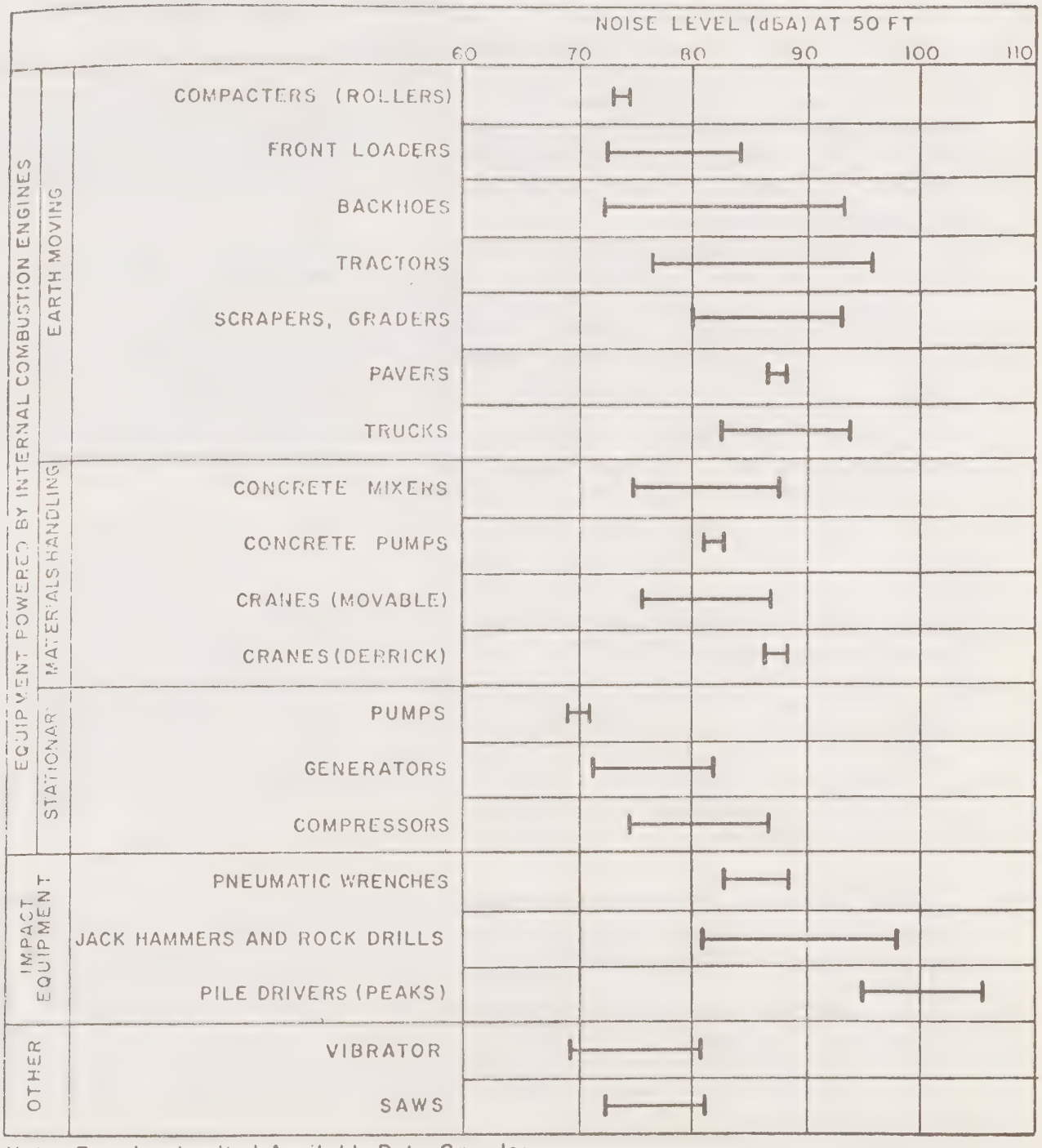
Potential adverse air quality impacts are primarily associated with Phase I construction activities and would stem from three sources: 1) grading, compaction, and demolition work associated with site preparation; 2) import of fill material, equipment, and construction materials, export of demolition debris, and transport of construction workers; 3) slight increases in study area congestion, occasioned by equipment and materials movement. Potential Phase II construction impacts on ambient air quality would be significantly less and would stem primarily from: transport of workers, import of construction materials, and export of demolition debris.

(Energy)

Construction of both Phases of the proposed project would require the direct expenditure of human and mechanical energy. Portions of this requirement would be met by the consumption of fossil-derived fuels which are irreplaceable and in limited supply. Additionally, the manufacture and transport of building supplies involve the expenditure of energy, much of which is met by the consumption of fossil fuels. Finally, the export of demolition debris and import of fill

FIGURE IV-1

CONSTRUCTION EQUIPMENT NOISE RANGES



Note: Based on Limited Available Data Samples

Source: Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances; Bolt, Beranek, and Newman; U.S. Environmental Protection Agency; December 1971

material would, for the most part, be accomplished by use of fossil fuel consuming transport vehicles. No attempt has been made to quantify this effect.

(Public Safety)
Urban construction zones can be hazards to public safety. Open excavations present a danger to site visitors and workers, (particularly children) unattended construction machinery can be operated by unauthorized persons in a dangerous manner, and stored building materials can be hazardous areas for playing children.

(Circulation)
A portion of the proposed project site is currently used for parking purposes by area workers. Construction of the proposed project would eliminate this opportunity, thereby reducing the supply of available close-in parking spaces. Moreover, many of the workers employed to construct the proposed project are expected to arrive at the job site by means of their privately-owned automobiles, thus compounding the competition for a reduced inventory of close-in parking spaces.

Additionally, the movement of construction machinery, export of demolition debris, and import of building materials would marginally increase congestion on nearby streets and occasionally impede the flow of vehicular traffic.

OPERATIONAL IMPACTS
The operational impacts, associated with both Phases of the proposed project, would be of two types: 1) those detectable only within close proximity of the proposed project site, and 2) those detectable throughout the proposed project's service area or at other points remote to the site. Moreover, these impacts (which would differ in intensity between Phase I and Phase II) are both beneficial and adverse in nature. They would include:

(Traffic)
Perhaps the most intense impact, associated with operation of the proposed project, relate to the traffic generation characteristics of the SWMC. During the initial period of Phase I, it is speculated that traffic patterns at the SWMC would approximate those now observed at the Berkeley Landfill. These arrivals are presently dominated by commercial haulers and privately-owned vehicles and are heaviest on the weekends. Table IV-1 displays the present traffic generation characteristics of the Berkeley Landfill based upon 265 TPD average throughput as observed in April, 1977.

Analysis of this data indicates that only 19% of the weekday and 2.0% of the weekend traffic currently generated by the landfill is represented by the City's collection fleet.

Present estimates are that the per capita waste generation (from all sources) will increase by approximately 18.0% in Berkeley by the year 1995. [Medium-and Long-Term Solid Waste Facilities Plan; Alameda County Solid Waste Management Authority, October 1978] This increase is also fairly consistent with that projected for the Phase II service area population. Moreover, a 2.7% rate of growth is projected for the Phase II service area [Ibid.] Therefore, if present waste disposal practices were to continue into the future, it can reasonably be anticipated that nonmunicipal collection fleet traffic to the SWMC (from the City of Berkeley alone) would increase by approximately 20.0% between now and 1995. Table IV-2 displays projected traffic generation characteristics based upon an expected 360 TPD 1995 Solid Waste Stream Flow from Berkeley and the outside disposers presently utilizing the Berkeley Landfill.

TABLE IV-1

TIME DISTRIBUTION OF COLLECTION VEHICLES AT THE BERKELEY LANDFILL, APRIL 1977

	Number of Vehicles - Weekday*a		
Time	Private	Commercial	City
6:00 AM to 8:00 AM	-	-	4
8:00 AM to 10:00 AM	28	24	12
10:00 AM to 12:30 PM	12	70	18
12:30 PM to 2:30 PM	7	50	10
2:30 PM to 4:30 PM	8	60	6
Totals	55	204	50

	Number of Vehicles - Weedend*b		
Time	Private	Commercial	City
6:00 AM to 8:00 AM	-	-	3
8:00 AM to 10:00 AM	48	15	6
10:00 AM to 12:30 PM	83	13	1
12:30 PM to 2:30 PM	128	13	-
2:30 PM to 4:30	112	11	-
Totals	371	52	10

*a Thursday.

*b Saturaday.

TABLE IV-2

1995 TRAFFIC GENERATION CHARACTERISTICS

(WEEKDAYS)

Time	Private	Commercial	City
6:00 AM to 8:00 AM	-	-	
8:00 AM to 10:00 AM	35	30	15
10:00 AM to 12:30 PM	15	88	23
12:30 PM to 2:30 PM	9	63	13
2:30 PM to 4:30 PM	10	75	8
Totals	89	255	63

(WEEKENDS)

Time	Private	Commercial	City
6:00 AM to 8:00 AM	-	-	4
8:00 AM to 10:00 AM	60	19	8
10:00 AM to 12:30 PM	104	16	1
12:30 PM to 2:30 PM	160	16	-
2:30 PM to 4:30 PM	140	14	-
Totals	464	65	13

The impact of additional traffic, generated by the proposed project, would be particularly severe during periods when nearby Golden Gate Fields is operational. Moreover, this impact would not (of necessity) be confined to the immediate site of the proposed project.

Phase II traffic impacts are likewise expected to be severe. Based upon an 860 TPD throughput and similar transport characteristics, daily traffic flow to the SWMC would equal that displayed by Table IV-3.

TABLE IV-3

POTENTIAL TRAFFIC GENERATION CHARACTERISTICS
BERKELEY SWMC - 860 TPD THROUGHPUT

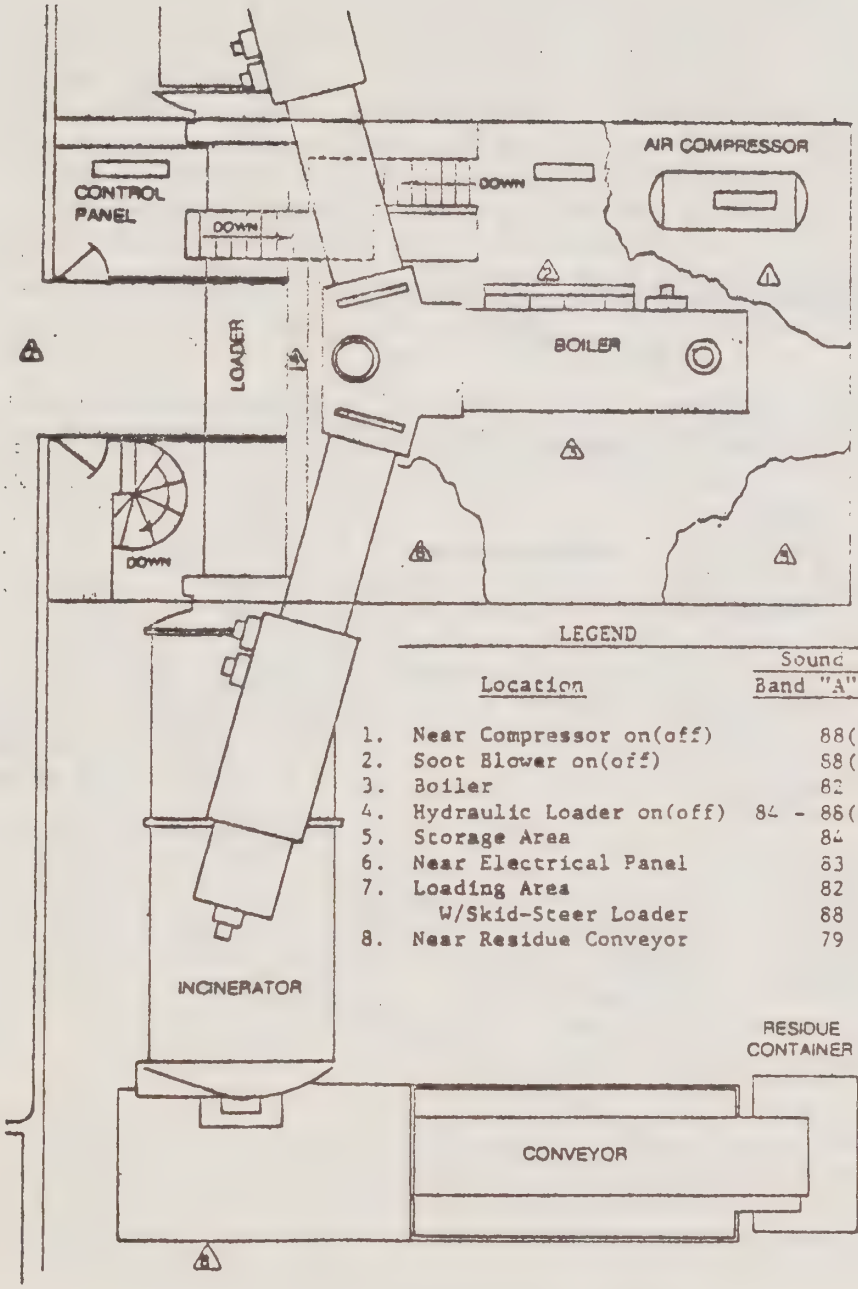
	Private	Commercial	City	Totals
Weekdays	178	662	63	903
Weekends	1204	168	13	1385

[Note: *This analysis may somewhat overstate the case. If the SWMC proves to be inconvenient and is characterized by long lines of vehicles waiting to discharge their loads, it is likely that many private citizen-disposers will elect to not utilize the facility. Additionally, this analysis ignores the impact of vehicles presently disposing of demolition debris. This material would not be accepted by the SWMC under present projections. Finally, it is quite conceviable that commercial haulers would elect to utilize vehicles with superior capacity characteristics than those presently utilized and thereby reduce the number of vehicle operations required to transport a given amount of refuse.*]

(Noise)
Operation of the proposed project would slightly elevate local ambient noise levels adjacent to the SWMC as one result of increased truck traffic. Within the receiving facility ambient noise levels are expected to reach 85 decibels (dB) at five (5) feet as the result of crawler tractor operations. Additionally; the trommel, conveyors, and fans of the Solid Waste Processing Facility will elevate ambient noise levels. This noise is expected to be confined on-site. Worker exposure to these noise levels is not expected to be sufficiently prolonged to occasion ill-effect and are anticipated to be within OSHA limits. Figures IV-2 and IV-3 display ambient noise levels detected at a facility similar to the proposed SWMC.

(Air Quality)
Standing refuse is subject to rapid putrefaction and corresponding odor generation, particularly during periods of high temperature. Concentration of refuse, some of which may be up to a week or more old prior to its collection, can be expected to cause odors; however, this effect is expected to be confined to the SWMC site.

During normal operation of the package incinerators, odors generated by the combustion of putrescible organic and certain inert components would be consumed and therefore not detected; however, incinerator malfunctions could occur and result in temporary, short-term odor releases.



LEGEND

	Location	Sound Level Band "A" dB	Imp
1.	Near Compressor on(off)	88(84)	105
2.	Soot Blower on(off)	88(87)	100
3.	Boiler	82	94
4.	Hydraulic Loader on(off)	84 - 86(81)	
5.	Storage Area	84	
6.	Near Electrical Panel	83	
7.	Loading Area	82	
	W/Skid-Steer Loader	88	
8.	Near Residue Conveyor	79	93

FIGURE IV-2

TYPICAL IN-PLANT SOUND LEVELS

Source U.S. EPA Report SW-797

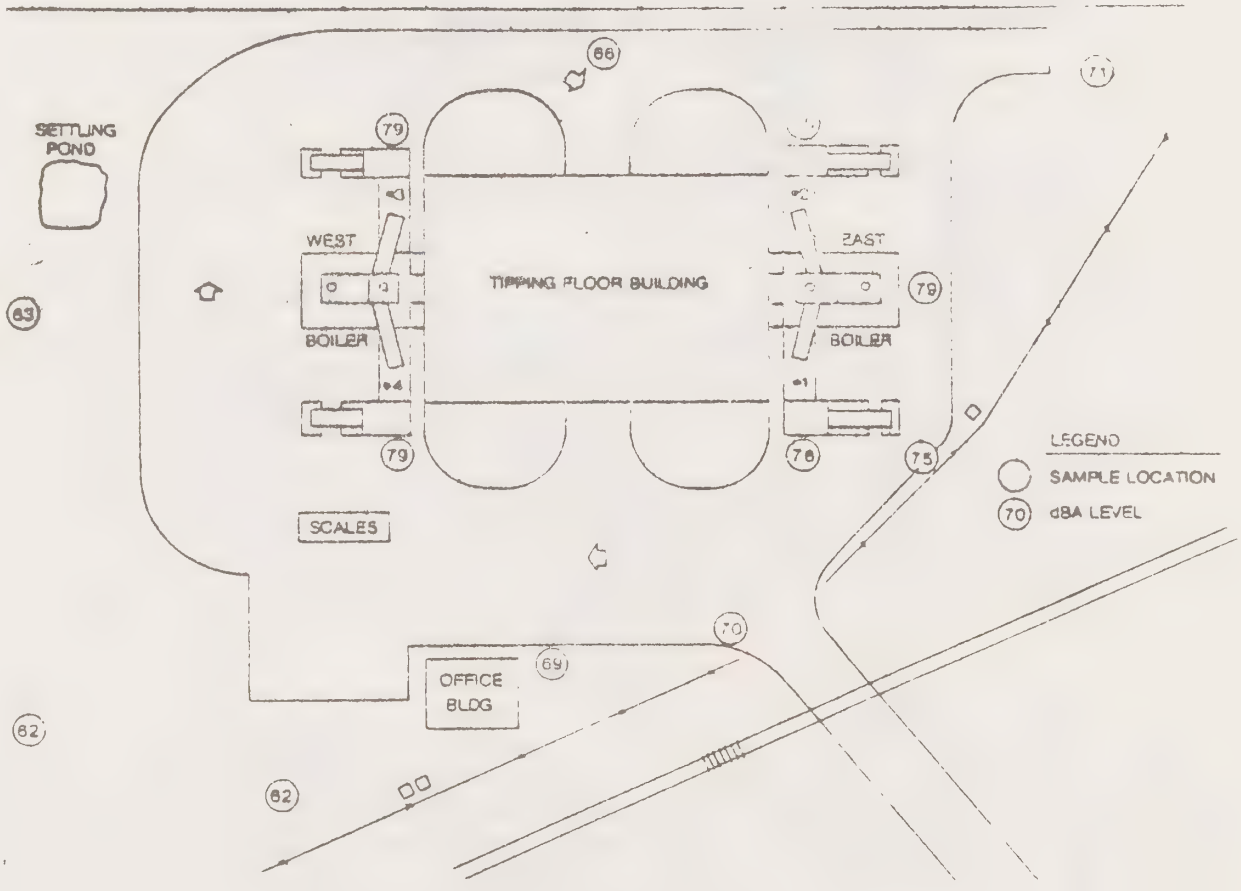


FIGURE IV-3

TYPICAL NEAR-PLANT SOUND LEVELS

Source: U.S. EPA Report SW-797

Although the package incinerators, suggested for the proposed project, are expected to meet BAAQMD emissions standards during normal operation, abnormal operation could result in releases of: sulfur dioxide, nitrous oxides, hydrogen chloride, carbon monoxide, carbon dioxide, hydrocarbons, and particulates, and thus adversely effect regional air quality. Table IV-4 displays stack emissions recorded at a facility similar to the proposed SWMC. It should be noted that this facility was designed to meet a state standard less rigorous than the Federal standard. Obviously, the SWMC would have to be designed to a more rigorous standard; therefore, the levels displayed should be regarded as "worst case" estimates which only addresses the "potential" of modular incinerators to produce air pollutants.

On-site ambient air quality could also be adversely affected by the generation of dust resulting from trommel and conveyor operations and from the movement of refuse.

Regional air quality would also be marginally degraded by the conveyence of solid waste transport of process residues to suitable landfills. Approximately 7 truck trips per day are expected to be made to meet this requirement during Phase I.

(Litter)
Although Berkeley's refuse collection fleet is composed of modern compactor vehicles (designed to reduce the broadcasting of collected refuse), some increase in litter can reasonably be anticipated along access roads in the vicinity of the SWMC. Moreover, the transport of refuse by private haulers, commercial scavengers, and individual citizens to the SWMC is likely to contribute to litter proliferation in the vicinity of the SWMC. However, litter and blowing refuse, currently in some evidence in the Marina area, would be reduced.

(Water Consumption/Wastewater Generation)
Operation of the proposed project would require an as yet undefined increase in water usage for; boiler make-up, ash quenching, vehicle washing, and facility washdown. Much of this water would ultimately be discharged to the sewer facilities of EBMUD; however, the discharged wastewater quantities and quality are not expected to require pretreatment or classification of the SWMC as an industrial discharger. Significant discharge water constituents can be anticipated to be: BOD - 1,780 mg/l; COD - 2,710 mg/l; Arsenic - 9 mg/l; and pH -12.

(Land Consumption)
SWMC ash and process residues would require ultimate disposal in an approved landfill disposal site. The dedication of such a site effectively prevents its use for alternative purposes and precludes its use for some future uses; however, operation of the proposed project would significantly reduce the County's future landfill requirement.

(Energy)
Operation of the proposed project would require the consumption of electrical energy for the operation of conveyors, the trommel, fans, etc. Portions of this requirement would be derived from irreplaceable and diminishing fossil fuel supplies. Although this energy requirement has not been completely defined as of this writing, a major feature of the SWMC is the production of steam from RDF. This steam, which would be sold to nearby users, is currently produced almost entirely from fossil fuels. Additionally, the proposed project would reduce haul distances for Berkeley's collection fleet thereby conserving the use of fossil-derived fuels.

NORTH LITTLE ROCK SUMMARY OF STACK EMISSIONS FOR MARCH, MAY, AND OCTOBER TESTS

	Field Test											
	Test 1: 3/20 - 24				Test 2: 5/22 - 26				Test 3: 10/9 - 13			
Emissions(Units)	Max.	Avg.	Min.	σ	Max.	Avg.	Min.	σ	Max.	Avg.	Min.	σ
Particulate(gr/m^3)*	.4227	.3458	.2284	.0682	.6359	.4609	.1709	.1318	.5291	.3136	.1531	.1327
Particulate(gr/SCF)*	.1847	.1430	.0998	.0282	.2779	.1906	.0747	.0545	.2312	.1297	.0669	.0549
Chlorides(mg/m^3)	609.9	344.7	217.0	126.8	34.9	26.0	19.4	6.0	193.3	154.8	127.4	24.2
Fluorides(mg/m^3)	4.3	2.3	1.6	1.0	1.7	1.3	.6	.5	1.2	.9	.5	.5
Stack O_2(%)†	18.3	17.2	16.5	.8	19.0	17.1	15.1	.9	18.0	16.9	13.8	.8
Stack CO_2(%)	No Data				No Data				6.8	4.4	2.6	.9
Stack CO(mg/m^3)	No Data				61.4	35.2	16.6	9.4	46.4	21.6	0.0	15.8
Stack NO_x(mg/m^3)	112.8	102.3	95.6	7.2	175.0	94.8	0.0	39.8	213.9	129.7	57.3	38.1
Stack SO_x(mg/m^3)	13.3	13.3	13.3	0.0	13.1	10.3	0.0	9.4	0.0	0.0	0.0	0.0
Stack H_2O(% by vol)	6.7	6.0	4.5	-	9.7	7.9	6.8	-	7.5	6.1	4.2	-
Stack CO_2(%)†	3.5	3.1	2.8	.3	4.5	2.6	1.9	.7	4.7	4.1	3.5	.4
Boiler O_2(%)†	No Data				14.5	11.5	9.2	1.7	12.6	10.7	8.8	.5
Boiler CO_2(%)	No Data				No Data				11.6	9.5	7.5	.6
Boiler CO(mg/m^3)	No Data				61.7	44.6	25.8	10.4	91.6	37.4	0.0	22.9
Boiler NO (mg/m^3)	334.3	272.2	181.5	56.3	510.0	284.4	76.6	114.4	450.8	386.9	192.9	58.4
Boiler SO_x(mg/m^3)	133.3	56.5	13.3	49.2	88.0	22.5	0.0	19.4	26.6	3.3	0.0	6.2
Particulate Size(μm)**	34.0	3.0	0.03	-	28.0	0.3	< 0.3	-	28.0	0.3	< 0.3	-
Hydrocarbons ‡(mg/m^3)	0.19	0.16	0.15	-	0.19	0.12	0.06	-	25.3	1.78	1.26	-
Opacity (%)	No Data				No Data				42	24	12	-
Flue Gas Temp(°F)	259	249	234	-	260	242	217	-	289	285	274	-
Flue Gas Flow(SCFM)	19,313	15,671	13,975	-	18,883	15,822	12,260	-	18,658	16,169	15,142	-
Flue Gas Flow(CFM)	26,166	21,085	18,436	-	26,084	22,893	17,518		26,207	22,823	21,484	-

† Data from Orsat analyser
σ Standard deviation
‡ Average of CH_4 - C_4H_{10}
* Corrected to 12% CO_2
** Average is MMD, mass mean diameter

TABLE IV-4

MODULAR INCINERATOR

TYPICAL STACK EMISSIONS

Source: U.S. EPA Report SW-797

The steam produced by the SWMC would represent use of a fuel source that is currently wasted and would reduce the current rate of consumption of irreplaceable and diminishing fossil fuels.

(Human Health and Safety)
Operation of the SWMC would marginally elevate risks to human health and safety. The intermixing of large collection trucks, transport vehicles, and private automobiles on the SWMC site would increase the likelihood of accidents; increased traffic along study area roads, particularly Gilman Street, would present potential hazards to motorists, cyclists, and pedestrians; and the operation of process equipment, within the SWMC, presents potential safety hazards to Center workers and visitors including inhalation of air-borne pathogens and exposure to explosion and carcinogenic materials.

(Aesthetics)
The completed SWMC would alter the present aesthetic character of the project site. Although the present site offers little in the way of aesthetic appeal, the completed facility would detract from the present sense of openness. Additionally, some sunshade and wind shelter characteristics of the proposed project site could be expected if the proposed project is constructed.

(Problematic Impacts)
The proposed SWMC is situated in a zone which is subject to the effects of seismic disturbance or flood. Either of these occurrances could temporarily halt operation of the SWMC. Moreover, the facility is subject to temporary disruption due to job actions of facility employees.

(Plan Conformance)
The proposed SWMC is in general conformance with the Alameda County Solid Waste Management Plan; however, this Plan is currently undergoing revision to eliminate the requirement for expansion of the SWMC to Phase II capacity and to identify the SWMC as a 355 tpd facility to serve Berkeley, Albany, and Emeryville. The proposed project is also in conformance with the ABAG Environmental Management Plan.

CHAPTER V

MITIGATION MEASURES

CONSTRUCTION IMPACTS

Construction of the proposed project would most likely be performed by a private firm under contract to the City of Berkeley. Typically, these contracts contain provisions which limit Contractor's activities to minimize public inconvenience and reduce potential adverse environmental impact. Recommendations for such contractual provisions are outlined in the following narrative:

(Air Quality)
The potential adverse impacts to local and regional ambient air quality could be mitigated by:

- Requiring the use of water in site grading and demolition zones to reduce the incidence of dust
- Limiting grading, demolition, and other site preparation activities to windless and low-wind days
- Placement of vegetative ground cover materials in exposed areas as quickly as practical
- Scheduling the delivery of building materials and export of demolition debris to off-peak traffic hours
- Requiring the shut-down of construction machinery not in actual use

(Fuel Conservation)
Fossil-derived fuels, required for construction of the proposed project, could be conserved by:

- Carefully scheduling delivery and export of materials and debris for off-peak traffic hours, thereby reducing non-productive idling time losses
- Shut-down of construction machinery not in actual use

(Public Safety)
Potential hazards to human safety can be minimized by:

- Erection of barricades and warning signs in excavation areas
- Effectively disabling construction machinery against unauthorized use
- Securing the construction site during non-work hours against unauthorized entry by means of a fence or patrol personnel
- Requiring the use of hard-hats by construction workers and site visitors in falling object danger zones

- Limiting visits to the construction site of personnel not directly involved with the construction of the proposed project

(Circulation)
Adverse impacts to circulation facilities adjacent to the proposed project could be reduced by:

- Encouraging car-pooling of construction workers
- Use of flex-time scheduling
- Limiting movement of construction machinery, import of building materials, and export of debris to off-peak traffic hours

OPERATIONAL IMPACTS
It is presently speculated that operation of the proposed project would be turned over to a private concern under a long-term lease or contract with the City. Provisions of the lease could be written to insure that various measures, designed to mitigate the probable impacts of operation, would be undertaken on an on-going basis. Other operational impacts, particularly those of circulation, future energy consumption, and noise, are functions of facility design and should be addressed by the Engineers in development of final facility lay-outs and specifications.

The recommended mitigation measures are discussed in the following narrative:

(Noise)
Design of the proposed project should provide for the use of suitable noise-attenuation devices and materials to insure that facility generated noises do not exceed detection levels of community acceptance at the property line of the proposed project. Additionally, on-site noise levels should be kept within OSHA limits for worker exposure.

(Air Quality)
Adverse odors and excessive dust levels associated with the operation of the proposed project could be mitigated by:

- Rapid handling (through appropriate design and staffing) of refuse masses
- Daily sweeping, clean-up, and wash down of facility grounds
- A minimum of weekly steam cleaning of floors, walls and equipment
- Periodic deodorizing
- Drawing incinerator combustion air from inside the building
- Use of water mist sprayers and worker respriators to reduce dust impacts

Adverse impacts to local and regional air quality as a possible result of incinerator operation or malfunction could be reduced by:

- Temporarily halting use of package incinerators during periods of malfunctions and transporting all refuse to landfill sites

- o Use of air pollution control equipment
- o Implementation of a comprehensive preventative maintenance program

Air quality and energy impacts associated with transport of refuse to suitable landfills could be mitigated by:

- o Scheduling transport at off-peak hours, thereby reducing idling emissions

(Circulation)

Phase 1 traffic impacts of the proposed project can be mitigated by:

- o Signalization of the East Frontage Road and Gilman intersection
- o Adoption of a one-way street system in the vicinity of the proposed SWMC which directs SWMC destined traffic away from the through traffic flow
- o Construction of the proposed University Street pedestrian overpass which will allow the diversion of Marina-bound pedestrian and bicycle traffic from Gilman Avenue.

Additional mitigation measures would be requied to accommodate anticipated Phase II traffic volumes. These could include:

- o Reconfiguration of the Gilman/I-80 interchange
- o Abandonment of the vehicle parking/servicing component of the Phase I project to improve site holding capacity
- o Purchase of additional adjacent land to improve site holding capacity
- o Site entrance/exit modifications
- o Construction of a railroad overpass along the Third Street right-of-way
- o Widening of Gilman Street in the vicinity of the SWMC to accommodate waiting vehicles without interfering with through traffic flows along Gilman Street.
- o Addition of left-hand turning lanes in the vicinity of the SWMC along Gilman

It is anticipated that adoption of these mitigation measures would sufficiently expand the capacities of the circulation system in the vicinity of the SWMC to accommodate vehicular flows expected during the operational modes of both Phases of the proposed project.

(Litter)

Litter generated along routes to the SWMC could be mitigated by:

- o Fencing of appropriate areas to contain litter
- o Planned programs of regular litter clean-up
- o Increased street sweeping programs along routes to the SWMC

- o Proper unloading and covering of collected refuse and residue transport vehicles

(Wastewater)
The potential of the proposed project to adversely affect the receiving waters of the State could be reduced by:

- o Berming the oil storage area with a roll-over curb
- o Fitting oil storage barrels with lids to prevent rainwater from entering the barrels and subsequently occassioning a discharge of oil
- o Situating the oil storage area well away from storm drainage inlets
- o Diverting surface drainage from the: tipping floor, truck washing area, and ash quenching operation to the sanitary sewer system

(Public Safety)
Hazards to public safety caused by operation of the proposed project could be reduced by:

- o Establishing separate entrances for public and commercial collection vehicles
- o Installing an on-site traffic control system
- o Supervising the general public during the loading and unloading of refuse and source-separated materials

(Aesthetics)
The potential of the proposed project to adversely affect the aesthetic character of the site can be mitigated by the use of sensitive architectural design and site planning techniques. Building design should include the use of building materials that will blend pleasantly with surrounding environs and the site layout should strive to preserve (to the maximum extent feasible) a sense of openess.

(Problematic Impacts)
An operational Management Plan should be developed for the proposed SWMC by the City in cooperation with the operator to identify emergency procedures for alternate handling methods of collected solid waste in the event of a temporary disruption of facility operations occassioned by seismic event, flood, or employee job action.

CHAPTER VI

ALTERNATIVES

PROJECT OBJECTIVE

The objective of the proposed project is the development of a mid-to-long-term solid waste management facility capable of accommodating Berkeley's solid waste stream through the year 2000.

Faced with the closure of the Berkeley Landfill and the non-availability of suitable close-in sites for sanitary landfill development, the City (through the City Council and under the supervision of the Department of Public Works) commissioned the San Francisco firm of Garretson, Elmendorf, Zinov, and Reibin to investigate and recommend to the Commission various collection schemes, facility configurations, and disposal options for implementation.

In recognition of the high energy and resources recovery potential of the City's solid waste stream, the Engineers were also charged with evaluation of various recovery methods (consistent with operational reliability and economic efficiency) to help offset anticipated operational costs associated with the recommended facility.

DO-NOTHING ALTERNATIVE

The first step, undertaken in a systematic alternative evaluation process, is to determine if any project is actually required. This step is known as the Null Analysis or Do-Nothing Project evaluation.

Essentially, this analysis was undertaken by City staff and the City Solid Waste Management Commission prior to contracting with the Engineers. Faced with the near-term closure of the Berkeley Sanitary Landfill Disposal Site and the unavailability of suitable close-in sanitary landfill disposal sites, it was determined that transport of the City's solid waste stream to available and projected sites, via the City's collection fleet, was inefficient and economically unacceptable. Therefore, a method of concentrating collected wastes and transferring them to more efficient transport vehicles (i.e. larger payloads) was found to be a basic requirement of paramount importance. Thus, the Do-Nothing Alternative was rejected as impractical and inconsistent with project objectives.

SELECTION PROCESS

The first step, undertaken by the Engineers, was the characterization of Berkeley's solid waste stream. This was followed by a survey of candidate disposal and resource recovery alternatives for the purpose of: identifying and screening available resource recovery systems; determination of technical reliability, energy productivity, economic costs, and environmental acceptability of resource recovery systems; and comparison of various materials and energy recovery systems with existing and anticipated City-wide collection practices.

ALTERNATIVE DESCRIPTION

For purposes of clarity, the several alternatives considered by the Engineers have been grouped into the following categories:

1) Transfer Station Only Alternatives
2) Transfer Station with Enhanced Materials Recovery
3) Transfer Station with Enhanced Energy Recovery

1) Transfer Station Only Alternatives

The two alternatives considered in this category are identical except that one provides for landfilling at the Vasco Road Sanitary Landfill location while the other provides for landfilling at the Acme Fill Company's Landfill. The differences in economic cost associated with these alternatives (see Table VI-1), reflect unequal hauling distances and differences in dumping fees. Costs associated with direct haul alternatives were based upon refuse collected by City of Berkeley collection vehicles only and do not include that portion of the solid waste stream collected and transported by private haulers or private citizens.

Under the Transfer Station Only Alternatives, solid waste would be transported to the transfer station facility where it would be discharged into a receiving pit, compacted, and then conveyed into large transport trucks for subsequent disposal at either the Vasco Road Landfill or the Acme Fill Company's Landfill.

No attempt would be made to mechanically retreive materials or energy from the solid waste stream.

2) Transfer Station with Enhanced Materials Recovery Alternatives

A. Low-Technology Materials Recovery

This alternative provides for hand-sorting recoverable materials and magnetic separation of ferrous metals in the waste stream. Collected solid waste would be delivered to the transfer station and discharged to a receiving pit. From the receiving pit, the waste materials would be conveyed over a trommel screen. By using 4.75 inch diameter trommel openings, approximately 50 percent of the waste stream (called the minus fraction) consisting of most of the ferrous cans would be delivered to a magnetic removal system where ferrous and bi-metal cans would be removed. The remainder of the minus fraction would be conveyed along a sorting line, where aluminum cans could be manually removed, and then to a stationary compactor.

The plus fraction would be discharged from the trommel onto a metal pan conveyor, where cardboard could be manually removed, and then to the stationary compactor.

From the compactor, both streams would be directly loaded into large transport trucks for ultimate landfill disposal.

Figure VI-1 is a flow diagram for this alternative.

B. Mechanical Processing

This alternative would utilize commercially available solid waste processing equipment for production of a shredded material, rich in light fractions (i.e. paper, cardboard, textiles, etc.) which could be utilized either as a fuel or feedstock for a more elaborate resource recovery system.

Under this alternative, collection vehciles would discharge their loads in a receiving area and material would be conveyed to a trommel where the light fraction would be separated from the heavier materials. The trommel screen openings would be sized at 2.5 inches to permit aluminum, bi-metal, and ferrous cans to report to the plus (light) fraction. The light fraction would then be conveyed to a shredder where the material would be reduced to approximately 3 inch particle size. Following this step, the material would be conveyed to an air classifier where it would be introduced into a stream of turbulent air. Light particles (consisting of plastics, paper, wood, textiles, food wastes, and small amounts

TABLE VI-1

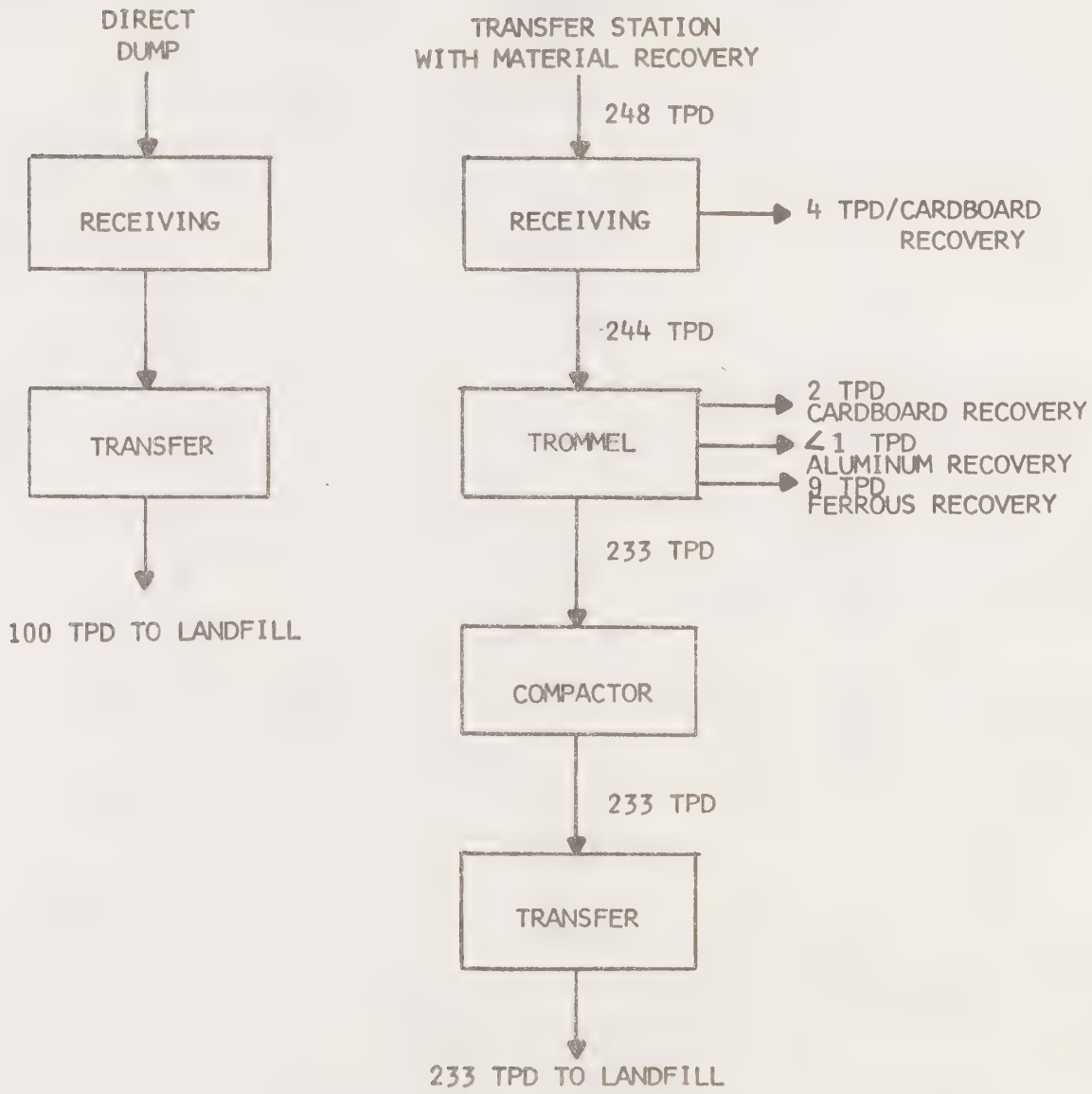
ECONOMIC COSTS FOR TRANSFER STATION ONLY ALTERNATIVES ($ PER TON)

	(1) Transfer Station	(2) Long Haul	(3) Total Long Haul (1) + (2)	(4) Direct Haul	(5) Disposal Charge	(6) TOTAL COST Long Haul (3) + (5)	(7) TOTAL COST Direct Haul (4) + (5)
Existing Alternatives:							
•Acme Fill	10.80	4.65	15.45	21.70	5.00	20.45	26.70
•Vasco Road	10.80	5.95	16.75	37.40	3.85	20.60	41.25

Source: Solid Waste Management Center. Phase Two; City of Berkeley; Garretson·Elmendorf·Zinov·Reibin; September 1978

FIGURE VI-1

LOW TECHNOLOGY MATERIALS RECOVERY ALTERNATIVE FLOW DIAGRAM

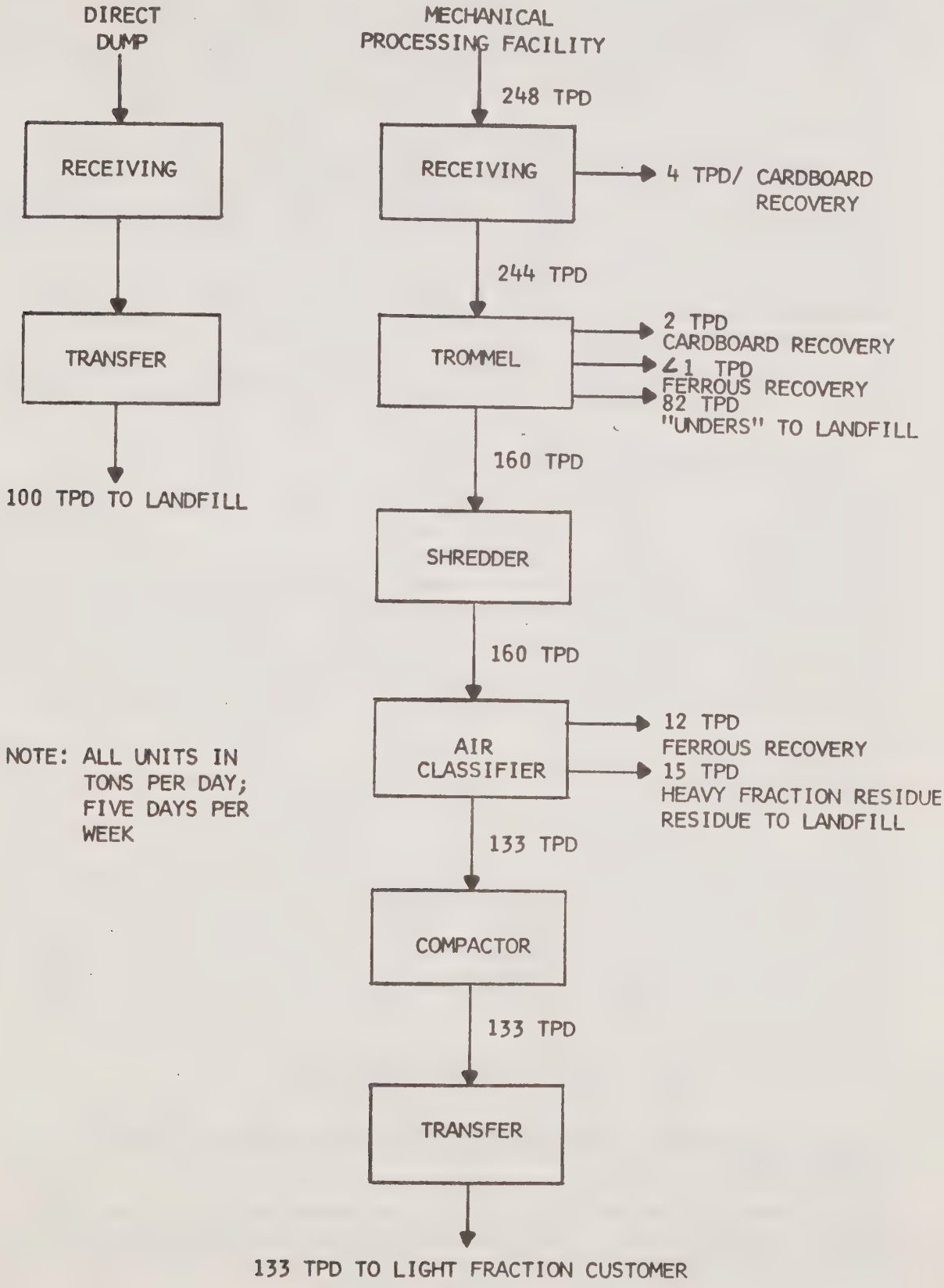


NOTE; ALL UNITS IN TONS PER DAY;
FIVE DAYS PER WEEK

Source: Solid Waste Management Center, Phase One; City of Berkeley; Garretson·Elmendorf·Zinov.Reibin; June 1978

FIGURE VI-2

MECHANICAL PROCESSING ALTERNATIVE FLOW DIAGRAM



Source; Solid Waste Management Center, Phase One; City of Berkeley; Garretson, Elmendorf, Zinov, Reibin; June 1978

of light metals) would rise and report to the cyclone separator where solid particles would be separated out from the airstream. The light fraction is then conveyed to a magnetic separator to remove ferrous metals. The remaining material, known as refuse derived fuel (RDF), could then be compacted and transported to a distant energy recovery facility or utilized on-site in either of several energy recovery alternatives which are discussed later.

Two streams of heavy (or minus) fractions derive from this alternative: 1) from the trommel, and 2) from the air classifier. Trommel heavy fractions would be conveyed to a magnetic ferrous removal system to recover ferrous material that may have passed through the trommel. The remainder would be conveyed to a drop-box for subsequent transport to a landfill. Air classifier heavy fractions (consisting of most of the ferrous metals, aluminum, and other non-ferrous metals, glass, ceramics, and some organics) would also be conveyed to a magnetic removal system for ferrous and bi-metal recovery. The remainder would be conveyed to a drop-box for subsequent transport to a landfill.

The additional facilities, required for this alternative, include a dust control system and a system control room. Figure VI-2 is a flow diagram of this alternative.

C. High Technology Materials Recovery

This process is actually an expansion of the mechanical processing system outlined above. The heavy fractions from the trommel and air classification processes would be routed to a second trommel screen with 0.75 inch openings. That portion of the waste material larger than 0.75 inches (which would consist of approximately half the glass and most of the aluminum and non-ferrous metals) would be routed to a Rising Current Separator which employs water to float light particles. These light particles would overflow onto a partioned dewatering screen while the denser materials, primarily metals and glass, would sink. The sink fraction would be routed to a Heavy Media Separator and the lighter (or float) fraction would be prepared for shipment to a landfill.

In the Heavy Media Separator, a higher effective liquid specific gravity is attained by adding a solid such as magnetite or ferrosilicon to water to create a pseduo-liquid. The feed fraction, entering the separator, will either sink or float. The float fraction, which is mostly organics, is combined with other process residues for removal to landfill. The sink fraction is composed of two separate elements: 1) a heavy non-ferrous/metal fraction, and 2) an aluminum and glass fraction. The heavy non-ferrous/metal fraction is collected and marketed. Aluminum and glass are delivered to an impact crusher and passed over a #20 mesh vibrating screen deck. Glass falls through the screen and is either marketed, landfilled, or utilized for road construction while the aluminum, which does not pulverize, comes off as the plus fraction and is recovered and marketed.

Figure VI-3 is a flow diagram of this alternative.

3) Transfer Station with Enhanced Energy Recovery Alternatives

A. Pyrolysis

Pyrolysis is a broad term given to a variety of processes that decompose processed or raw wastes by the action of heat in an oxygen-deficient atmosphere. The process produces fuels in either combustible char, liquid, or gaseous forms that can be immediately burned on-site or transported for sale and use at other

locations.

Most pyrolysis systems, designed for use with solid waste stream feedstocks, are currently in the developmental stage; however, two systems were considered appropriate to handle Berkeley's solid waste stream. These were:

1) Andco-Torrax Process
2) BSP Pyrolyser Process

1) The principal components of the Andco-Torrax process are the gasifier, secondary combustion chamber, primary combustion chamber, air pre-heating regenerative towers, boiler system, and a gas cleaning system. Unprocessed solid waste is charged into the gasifier, which is a vertical shaft furnance designed so that the descending refuse and the ascending high temperature gases become a counter-current heat exchanger.

The heat for pyrolyzing and drying the solid waste and for melting inert materials is produced by the combustion of the carbon char, produced by the process, with the aid of 1,800°F air supplied to the hearth zone of the gasifier from the regenerative towers. Melted inerts form a molten slag that is continuously drained to a water quench tank to produce a black, granulated residue. This material is transported to a suitable landfill.

The energy value of the gas produced by this system is too low to make off-site transportation and use economical. Therefore, the gases would be injected into an afterburner, or secondary combustion chamber, where they would be burned to completion. The heat which is thus released is diverted to a waste heat boiler where it is recovered as steam. Cooled waste gases would then be ducted off to an electrostatic precipitator for air pollution control.

Figure VI-4 is a process flow diagram of the Andco-Torrax Pyrolysis Process.

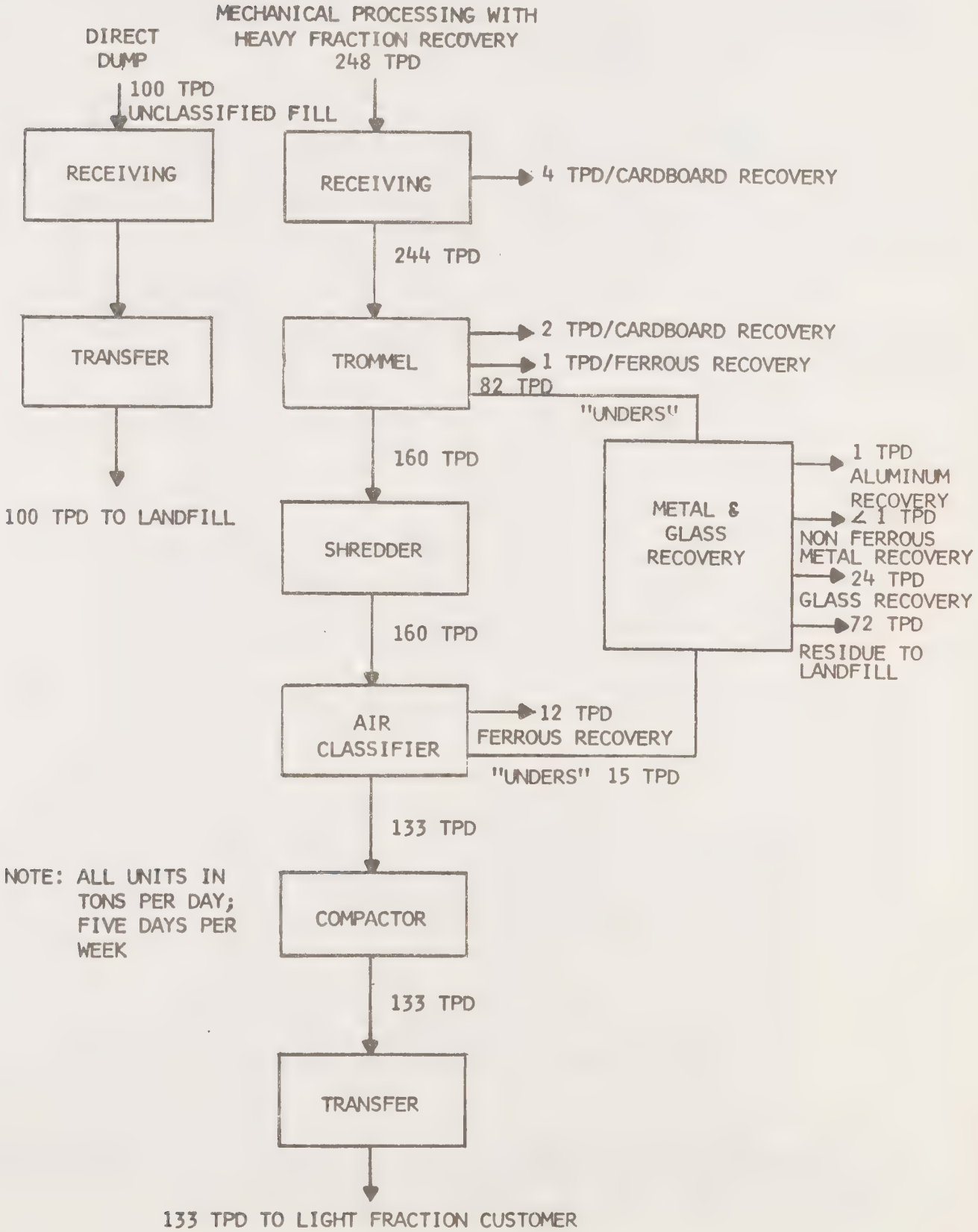
2) The BSP Pyrolyser process consists of pneumatically conveying previously processed waste (RDF) into a multiple-hearth furnance where it is progressively moved from upper levels to lower level hearths by means of rotating rabble arms. A small percentage of the combustibles are burned in the process to evaporate refuse moisture and furnish heat for decomposition of approximately 2,000°F. The waste gas is passed through an afterburner and waste heat boiler and then through a wet scrubber, for purposes of air pollution control, prior to being vented to the atmosphere. Char accumulated at the bottom of the furnace is collected in a quench tank and subsequently disposed of by landfilling. Figure VI-5 is a flow diagram of the BSP Pyrolyser System.

B. Waterwall Combustion Systems

Waterwall Combustion systems are often called Waterwall Incinerators and are designed to burn refuse in a specially designed furnance that is jacketed with

FIGURE VI-3

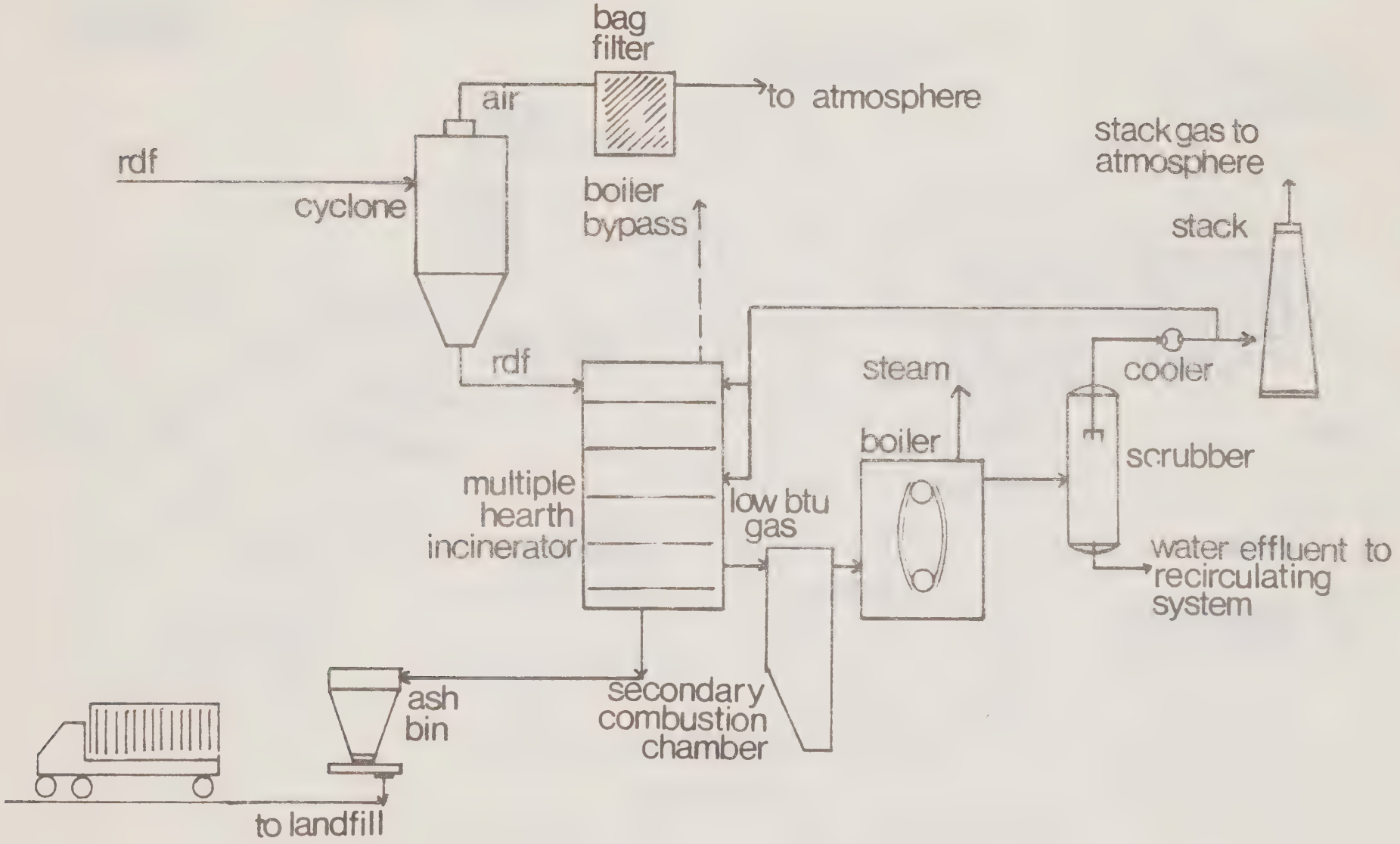
HIGH TECHNOLOGY MATERIALS RECOVERY ALTERNATIVE



Source: Solid Waste Management Center, Phase One; city of Berkeley; Garretson, Elmendorf, Zinov, Reibin; June 1978

FIGURE VI-5

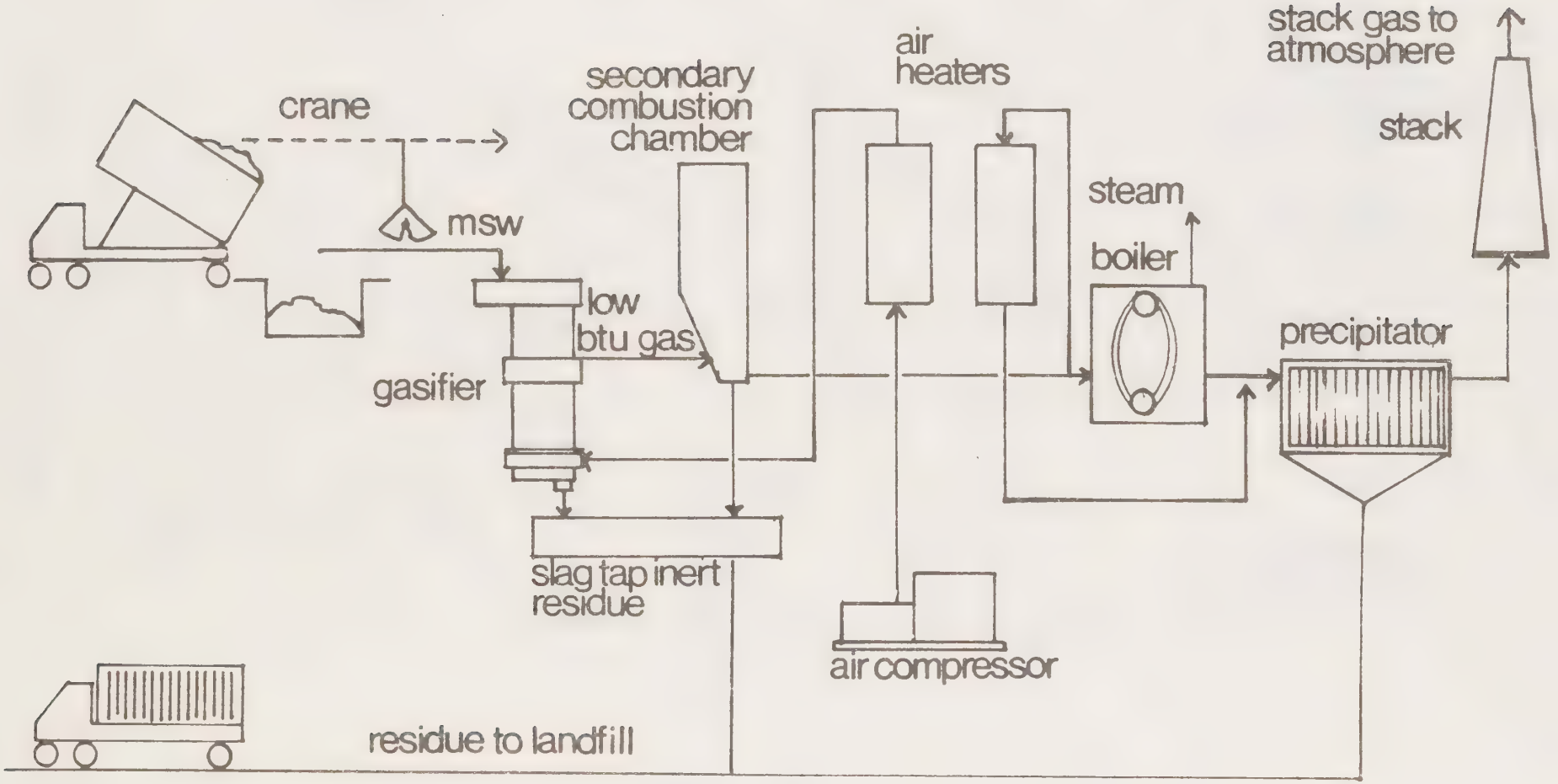
TYPICAL BSP PYROLYSER PROCESS



Source: Solid Waste Management Center, Phase Two; City of Berkeley; Garretson, Elmendorf, inov, Reibin; September 1978

FIGURE VI-4

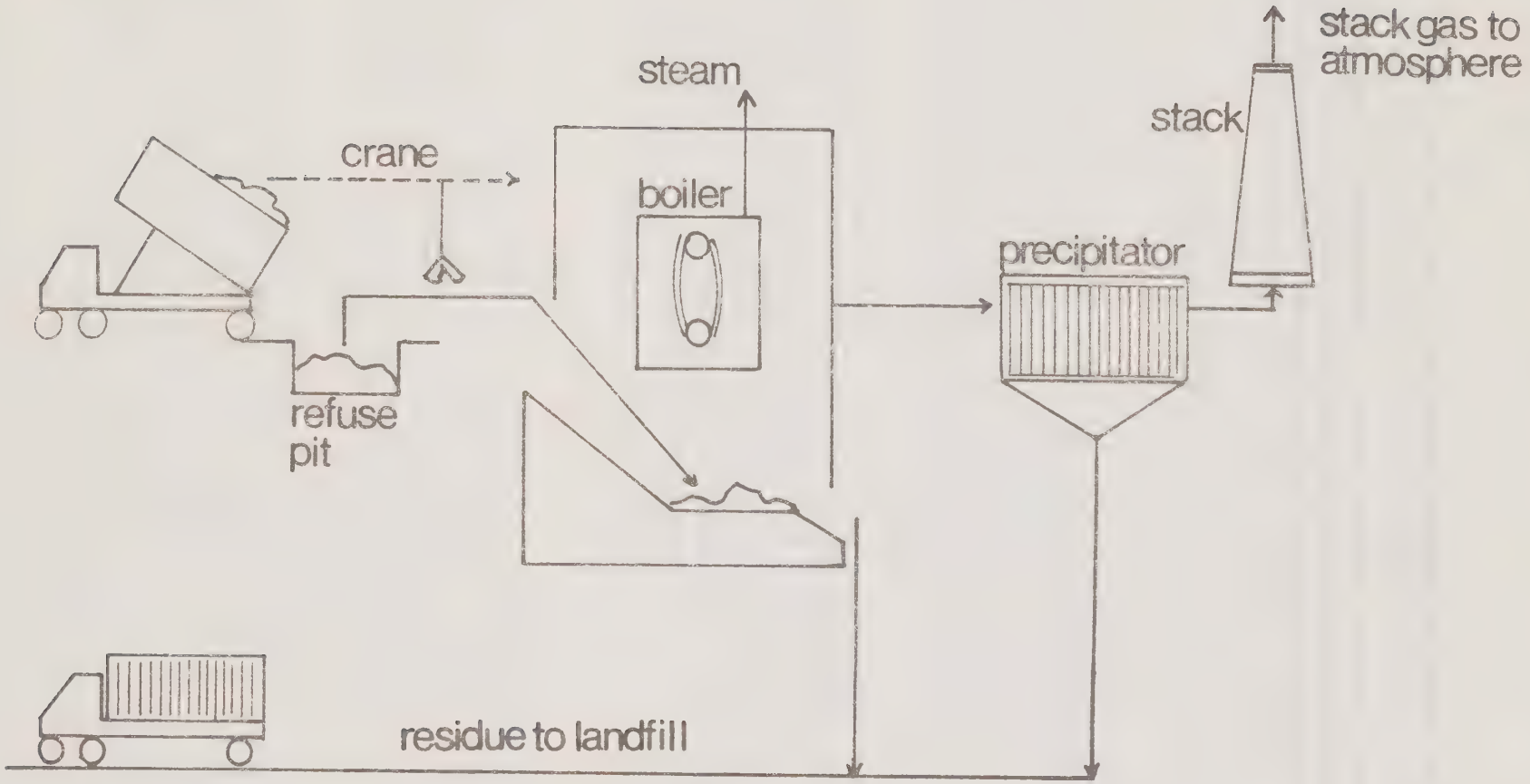
ANDCO-TORRAX PYROLYSIS PROCESS



Source: Solid Waste Management Center, Phase Two; City of Berkeley; Garretson, Elemdorf, Zinov, Reibin; September 1978

FIGURE VI-6

TYPICAL WATERWALL COMBUSTION SYSTEM
UNPROCESSED REFUSE



Source: Solid Waste Management Center, Phase Two; City of Berkeley; Garretson, Elmendorf, Zinov, Reibin; September 1978

water-filled tubes to recover heat. Heat recovered as steam can be used directly or converted to electricity.

Several manufacturers produce Waterwall Combustion systems which can be configured to accept unprocessesed or processed waste material. The advantages of utilizing processed waste over raw waste feedstocks is that combustion is more complete and that residues from the process, which require subsequent landfilling, are reduced in volume.

Figure VI-6 is a flow diagram of a typical Waterwall Combustion System.

C. Package Incinerators

Package Incinerators incorporate a controlled air principle to achieve an extremely high level of combustion and reduce the need for ancillary air pollution equipment. Each unit can be configured to accept from 1 to 4 tons per hour of either processed or unprocessed solid waste feedstocks and can be arrayed in a building-block fashion to match incoming refuse requirements. These units afford the additional advantage of being relatively independent from one another, thereby simplifying routine maintenance requirements.

Solid waste feedstocks are fed into a primary combustion chamber where they are slowly burned under starved-oxygen conditions. The resulting gas is passed through a second chamber where excess air is injected, causing intense heat and burn-off of particulate matter. The hot effluent gas, from the second chamber, then passes through a waste heat boiler to produce steam which can be used directly or to power electric generators. Ash residue from the process is water quenched and disposed of in a suitable landfill.

Figure VI-7 is a flow diagram of a typical Package Incinerator System.

ALTERNATIVE ANALYSIS

The environmental impacts associated with all considered alternatives are twofold: Those related to construction, and those associated with operation of the proposed project. Construction-related impacts are expected to be for the most part: of short-term, temporary in nature, and detectable only within close proximity of the construction zone. Impacts associated with operation of each of the considered alternatives, on the other hand, are expected to be permanent and may have effects remote from the project site.

The construction impacts, associated with each of the considered alternatives are typical of medium to large construction projects in urban areas and vary only in scale. These include: marginal degradation of local ambient air quality, occasioned by site preparation activities and emissions from fosil fuel powered construction machinery; elevated ambient noise levels; slight increases of vehicular activity on site access roads and the regional circulation network, resulting from movement of equipment and construction materials; and increased competition for available close-in parking spaces by construction workers arriving at the site in their private vehicles.

Additionally, construction would require the use of materials produced in part from nonreplenishible natural resources and the dedication of human and mechanical energy.

Most of these impacts can be reduced to levels of general community acceptance by use of mitigation measures similar to those identified for the proposed project.

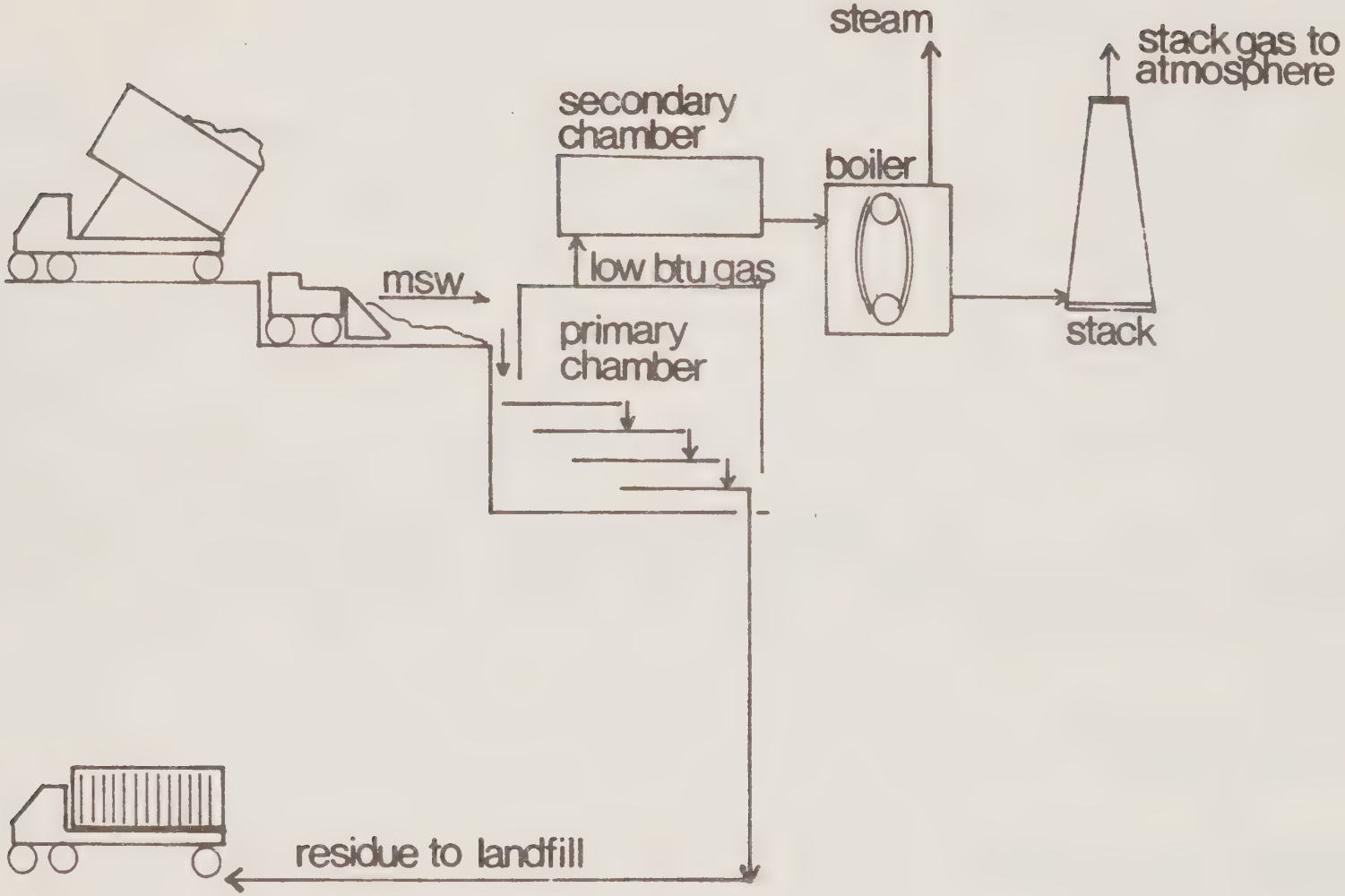
The operational impacts, associated with each of the considered alternatives are both adverse and beneficial and can be expected to be permanent. Moreover, the impacts can be expected to be detectable not only in close proximity to the project site but also throughout the region. Adverse impacts include: a long-term commitment to the use of mechanical energy, much of which would derive from irreplaceable fossil-fuel sources; increased generation of heavy truck traffic along a throughfare that is part of the City's bikeways system, thereby increasing the chances of accidents to pedestrians and cyclists; elevated ambient noise levels, occasioned by increased heavy truck traffic in the vicinity of Second and Gilman; degredation of ambient air quality through dust and odor generation and through incinerator pollutant emissions; and dedication of land, over the long-term, which will render it unsuitable for concurrent alternative uses and may preclude its use for certain activities into the future. Beneficial impacts, of all but two of the considered alternatives, include an environmentally superior method of managing municipal solid waste than is currently practiced as well as recovery and reuse of irreplaceable natural resources and fossil fuels.

The impacts, associated with operation of any of the considered alternatives, are similar to those associated with the proposed project and vary only in scale. Thus, the mitigation measures suggested for the proposed project would also reduce some of the impacts associated with considered alternatives.

Tables VI-2, VI-3, and VI-4 compare the environmental, economic, and resources management characteristics of the considered alternatives. To facilitate comparison, elements of the proposed project have also been included.

FIGURE VI-7

TYPICAL PACKAGE INCINERATOR



Source: Solid Waste Management Center, Phase Two; City of Berkeley; Garretson, Elmendorf, Zinov, Reibin; September 1978

ALTERNATIVE	Operational Energy*	Fuel[1]	Fuel[2]	Air	Water	Noise	Traffic	Odor	Land Consumption
Do-Nothing/Long-Haul	------	257,600	----	2	N/C	N/C	2	N/C	4
Transfer Station Only	100	93,600	----	2	1	1	2	1	3
Transfer Station w/Materials Recovery									
Low Tech.	225	86,580	----	2	1	1	3	1	3
Mech. Processing	1,175	51,280	22,044	2	1	2	3	1	2
Hi. Tech.	1,825	44,720	22,044	2	3	3	3	1	1
Energy Recovery Options									
Andco Torrax	-----	-----	-----	2		N/C	N/C	1	1
BSP Pyroleser	-----	-----	-----	2	1	N/C	N/C	1	1
Waterwall Combustion Package Incinerators	-----	-----	-----	2	1	N/C	N/C	1	1

$Fuel_1$ = Transport of residuals to landfill at Vasco Road.
$Fuel_2$ = Transport of RDF to City of Alameda.
1 = Impact minor, available mitigation measures could reduce below detection levels.
2 = Impact minor, available mitigation measures should keep impact within bounds of normal community acceptance.
3 = Potential for impact significant, available mitigation measures will not reduce below detection levels.
4 = Potential for impact severe, no available mitigation measures to reduce below detection levels.
* = Kwh

TABLE VI-2

ALTERNATIVES ENVIRONMENTAL COMPARISON

ALTERNATIVE	Card-board	Bi-Metal cans	Aluminum cans	Glass	Other non-ferrous	Energy Output**
Do-Nothing/Long-Haul	----	----	----	----	-----	----
Transfer Station Only	1,040	----	----	----	-----	----
Transfer Station w/Materials Recovery						
Low Tech.	1,560	2,350	50	----	-----	----
Mech. Processing	1,560	3,120	*	----	-----	-----
Hi. Tech.	1,560	3,120	300	4,00	18,000	-----
Energy Recovery Options						
Andco Torrax						198,682
BSP Pyroleser						153,369
Waterwall Combustion						181,254
Package Incinerators						188,226

*Assumes operational Recycling Center
**Expressed as millions of Btu's

TABLE VI-3

ALTERNATIVES

RESOUCES MANAGEMENT

COMPARISON

Spectrum Northwest

ALTERNATIVE	Capital	Operational	Projected Revenue
Do-Nothing/Long-Haul	1,440	1,127	-----
Transfer Station Only	1,976	1,222	12 - 42
Transfer Station w/Materials Recovery			
Low Tech.	2,701	1,222	88 - 131
Mech. Processing	5,170	1,231	479 - 532
Hi. Tech.	7,814	1,013	678 - 723
Energy Recovery Options			
Andco Torrax	18,200	3,060	819
BSP Pyroleser	12,000	2,750	713
Waterwall Combustion	16,500	2,760	804
Package Incinerators	6,600	1,540	942

TABLE VI-4

ALTERNATIVES ECONOMIC COMPARISON

($ X 1,000)

Source: G-E-Z-R

CHAPTER VII

STATUTORY REQUIREMENTS

POTENTIAL ENVIRONMENTAL EFFECTS FOUND TO HAVE NO SIGNIFICANCE

(Vegetation)
The proposed project would include various site preparation activities which would result in the removal of most vegetation on the site; however, the site's floral inventory consists entirely of uncultivated, invader species of weeds and low shrubbery. Consequently, this effect is deemed to be of insignificant environmental impact.

(Wildlife)
The proposed project site is situated in an urban industrialized setting and is not known to provide habitat for animal species other than rodents, domesticated cats and dogs, and visiting birds. Construction and operation of the proposed project may reduce the site's appeal to these species; however, this effect is deemed to be of insignificant environmental impact.

PROBLEMATIC EFFECTS AND ENVIRONMENTAL ACCIDENTS

(Archaeological)
Construction of the proposed project would take place on previously disturbed fill land which is not known or suspected to contain materials of archaeological or historical significance; however, should such materials be discovered during excavation, contractual provisions (within the excavators contract) should provide that work immediately cease and a competent professional be engaged to evaluate the significance of the find and recommend suitable mitigation measures.

(Natural Disaster)
The operational proposed project could be adversely affected by either of two natural disasters: 1) flood, and 2) earthquake. Should either of these occurences be sufficiently severe to cause interruption of normal operations, the City's collected refuse could be long-hauled to an appropriate landfill until repairs were effected.

SIGNIFICANT UNAVOIDABLE EFFECTS

There are no significant effects of the proposed project which cannot be reduced to levels of community acceptance through use of proposed mitigation measures.

SIGNIFICANT ENVIRONMENTAL CHANGES

The proposed project, if constructed, would require the dedication of human and mechanical energy which would be lost for alternative uses. Moreover, construction of the proposed project would require the dedication of building materials (derived from raw materials and engery) which, for the most part, would be irrecoverable for alternative uses.

SHORT TERM USE vs. LONG TERM PRODUCTIVITY

The proposed project would meet the short- to mid-term needs for a solid waste management facility within the service area. To the extent that the project would: 1) reduce the consumption of petroleum fuels for transport of solid wastes, 2) reduce fossil-fuel requirements to produce steam, and 3) retrieve materials from the solid waste stream for re-use and recycling, the project would contribute to long-term productivity. However, energy production from solid waste may develop into a regional trend which would preclude the development of markets for recoverables and the initiation of projects and programs to accomplish such objectives. Thus, the energy conversion component of the proposed project can be viewed as diminshing (over the long term) from the overall productivity potential of the environment.

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CHAPTER VIII

COMMENTS AND RESPONSES

The Berkeley Solid Waste Mangement Center Draft Environmental Impact Report was released for public review in February, 1979. Copies of the DEIR were distributed to Agencies, individuals, and groups known to have an interest in the project. Moreover, the public was informed via newspaper announcement that the draft was available, together with various reference materials cited by the DEIR, for public examination during regular business hours at the offices of the Department of Public Works. A public hearing on the DEIR's adequacy was conducted by the City's Planning Commission in April, 1979 and written comments were received through March of 1979. Following is a recapitulation of the comments received (and responses thereto) which raised issues of substance regarding the proposed project and the DEIR.

COMMENTS OF UNIVERSITY OF CALIFORNIA, BERKELEY

1) The site map was not included in the draft plan sent out. This map should be included in the Final EIR.

2) The objective of the total project as outlined on Page 5 is to provide for the eventual capability of processing 810 tons of solid waste at the proposed site. This is based upon the County Solid Waste Plan for only four facilities in the county and only one facility north of San Leandro which is the proposed Berkeley facility. Thus the Berkeley facility is being designed to meet a large part of the waste disposal needs of the City of Oakland -- the City of Berkeley currently generates only 200 tons per day of solid waste and is projected to have a maximum of 360 tons. Given the limited land area at the site and in Berkely in general, the report fails to justify why it is necessary to import solid waste into Berkeley with resultant traffic generation and other negative effects.

3) The expansion of the Center in Phase 2 to handle 800 tons of waste will probably require curtailing public access since the site cannot accomodate the anticipated traffic volumes (page 10). Phase 2 would serve the solid waste needs and vehicle trips of other cities while Berkeley residents and others able to use the center during Phase 1 would be forced to drive elsewhere to personally dispose of waste. This plan seems to generate an unnecessary amount of travel. The final EIR should identify the alternatives planned for personal disposal of waste in Phase 2 at this site.

4) Page 10 of the draft EIR indicates that public access, to the site, would probably be curtailed in Phase 2; however, the table on page 37 includes private vehicles as major users of the site. This inconsistancy should be clarified.

5) The discussion of effects on air quality (pages 37-38) does not indicate when information will be available on emission characteristics of package incinerators or provide any estimates of the frequency of temporary, short-term odor releases or the areas which might be affected by short-term odors. These are matters of concern with regard to University housing located to the east and

slightly north of the site and with regard to the possible future development of the undeveloped parcels immediately east of the site.

6) The mitigation measures proposed on page 44 to accomodate anticipated traffic volumes include the purchase of additonal land to improve the site holding capacity or relocation of part of site uses planned for Phase 1. These future needs for additional land should be qualified and the direction tentatively identified.

RESPONSES TO UNIVERSITY OF CALIFORNIA, BERKELEY

1) Comment acknowledged. This oversight has been corrected in the final version of the EIR.

2) The Alameda County Medium and Long-Term Facilities Plan is based upon the siting of several transfer stations which are geographically within economically ideal distances of major waste generation areas (and landfill sites projected to be operational) over the 20 year planning horizon. To determine the most cost-effective arrangement of transfer stations, an evaluation of the costs associated with using either two or three transfer stations for the Hayward-to-Berkeley area were evaluated. Three alternative transfer station schemes were developed for the entire county. The first scheme envisioned three transfer stations in the Hayward-to-Berkeley area, one transfer station in the Fremont area, and one transfer station in the Pleasanton area. Scheme two utilized two transfer stations in the Fremont area and one transfer station in the Pleasanton area, while scheme three included transfer stations at: the Berkeley Landfill, the Davis Street Landfill, and one each in the Fremont and Pleasanton areas.

Further economic analysis also indicated that one transfer station could effectively serve the Berkeley, North Oakland, and South Oakland service zones if it were located in the Lake Merritt-Piedmont area, or two stations (one located somewhere within the North Oakland Berkeley zone to serve these areas with a second located in the South Oakland-San Leandro zone). However, it was concluded that three transfer stations in the Berkeley-North Oakland-South Oakland service areas would not be aconomically feasible as this arrangement would violate the break-even analysis. However, recent developments (as one result of the public review and comment associated with this document) make it very likely the County Plan will be modified to reflect a 355 tpd facility (Phase I SWMC) only for Berkeley. If the SWMC should ever expand to Phase II capacity in the future, a supplemental EIR would be required to address impacts on individual citizen-disposers.

3) Comment acknowledged.

4) There is really no inconsistancy. The statement on Page 10 alludes to what would probably develop as operational policy; however, as of this writing, a firm decision to implement this restriction has not been made. Therefore, the DEIR'S evaluation of impacts stated the worst foreseeable case.

5) As the DEIR indicates, the most likely source of occasional, short-term odor releases from the SWMC are the putrescible components of the collected solid waste stream awaiting incineration or transport to landfill. Odorous releases, attributable to the package incinerators, would indicate a malfunction (as the process, during normal operation, consumes odorous gases).

Rigorous preventive maintenance procedures would no doubt be employed to prevent such an occurence; however, accidents could occur. There is no known way to accurately predict the probable frequency and/or duration of such events.

6) Please see Forward to Final version.

COMMENTS OF ALAMEDA SOLID WASTE MANAGEMENT AUTHORITY

1) Page 12. Permits are not required from the State Solid Waste Management Board and the Alameda County Solid Waste Management Authority. They need to approve of the project in terms of a determination of conformance to the Alameda County Solid Waste Management Plan only. In addition, the local Enforcement Agency (City of Berkeley Health Department) needs to issue a Solid Waste Facilities Permit for this facility.

2) Page 32. The State Solid Waste Management Authority does not have the statutory responsibility to issue a Solid Waste Management permit; it has the statutory responsibility to concur or not concur in the issuance of the Solid Waste Facilities Permit proposed by the Local Enforcement Agency (Berkeley Health Department).

3) Page 43. The EIR doesn't address the impact of a disruption in service at the proposed SWMC (due to earthquake, labor dispute, incinerator malfunction, or other cause). A back-up plan is needed and the lack of such a plan could result in serious environmental problems.

4) Pages 6-7. It is stated that the Modular Package Incinerators Appropriate Air Pollution Control Equipment and Steam Transmission lines will be abandoned in Phase I if they do not meet air quality requirements or if they are found to be "economically infeasible". Those same elements may not be included in Phase II "depending upon the proven environmental engineering, and economic viability...demonstrated in Phase I".

This possibility should be treated as a transfer station and resource recovery alternative (pages 48-51) and the social, economic, and environmental impacts and relationship to the countywide plan should be discussed.

5) There is no economic impact of the project itself. Whether it would be cost-effective, nor how it relates to the economics of the entire county plan. For example, is the service area the most cost-effective in countywide terms? Alternate service areas and alternate sites should be discussed, including sites outside the City of Berkeley, as a means of relating the project to the countywide plan.

6) The Countywide Plan calls for a North Oakland area transfer station at 810 tpd and a central resource recovery facility. What would the impact of the Berkeley proposal be on these aspects of the adopted plan? If the Berkeley site is to serve all or a portion of the potential for the North Oakland transfer station, an alternative site should be explored.

7) The fact that the flea market service area is greater than the city should be mentioned (page 10). When this service is discontinued, where does the public go? If the excess residue (page 10) goes outside the city, how does this relate to the subarea concept in the countywide plan?

8) How does the solid waste recovery rate compare to that in the County Plan.

9) The "Permits Required" section should be expanded to include "Approval Required" and should include plan conformance approval by the Alameda County Solid Waste Management Authority and State Solid Waste Management Board (page 12).

10) The map on page 22 indicates the study area in the wrong location.

11) The surcharge in Berkeley's refuse charge and its purpose should be mentioned (page 26).

12) The approximate amount of recycled waste should be given, rather than "a substantial portion" (P.27).

13) The following language should be added to the bottom of page 32: *"The County Solid Waste Management Plan consists of three documents: 1) Solid Waste Management Plan for Alameda County (Policies Plan), adopted by the Alameda County Board of Supervisors, May 18, 1976, 2) Solid Waste Management Facilities Plan for Alameda County (Short-Term Plan), adopted by Alameda County Solid Waste Management Authority, March 16, 1977, and 3) Medium- and Long-Term Solid Waste Facilities Plan adopted by the Alameda County Solid Waste Management Authority, October 5, 1978. All facilities proposed for development in the County must be reviewed by the Authority for conformance to the Countywide Plan."*

14) There should be mention of ongoing studies in the region to determine the degree and effect of air pollution emanating from proposed resources recovery plants (P.35).

15) There should be an assessment as to how effectively the proposal meets or conflicts with the county goals and policies.

16) CEQA Guidelines should be reviewed so that all required sections are included.

RESPONSES TO COMMENTS OF ALAMEDA SOLID WASTE MANAGEMENT AUTHORITY

1) Comment acknowledged. The recommended change has been made in the final version of the EIR.

2) Comment acknowledged. The recommended clarification has been included in the final version of the EIR.

3) Comment acknowledged. A discussion, relating the potential for disruption and the environmental impacts likely to occur has been added to the final version of the EIR.

4) If the modular incinerators (and associated energy recovery facilities) were abandoned in Phase I, the proposed project would function as a refuse derived fuel (RDF) - Resource Recovery/Transfer Station and, as such, would be in conformance with the existing Countywide Plan.

The processed RDF would be transported to a county central energy recovery facility and incinerated; thus, the effect (or potential for effect) on regional air quality, associated with energy recovery, would be approximately equal. However, increased truck traffic, and a corresponding increase in fossil fuel consumption and air pollutant generation, would result from the transport of RDF to the central energy recovery facility. Present estimates are that up to 34,000 tons of RDF could be produced by the SWMC for transport and sale to a central energy resource recovery facility annually (assuming 360 tons per day throughput). If the City of Alameda's facility were chosen to receive the processed RDF,

approximately 1,750 vehicle trips totalling 89,960 miles annually would be required. This transport requirement is estimated to require approximately 18,360 gallons of diesel fuel [Solid Waste Management Center Phase Two Report: G-E-Z-R; September, 1979 (Appendix E)].

5) The cost characteristics of the proposed project and alternatives to the proposed project have been displayed in a revised Chapter VI-Alternatives (see Table VI- 2).

According to data presented in the Medium- and Long-Term Solid Waste Facilities Plan Alameda County Solid Waste Management Authority; October, 1978], the Vogel Approximation Method concluded that the most cost-effective distribution of solid wastes to transfer station T-1 would derive from the following waste generation areas:

- Albany
- Berkeley
- Emeryville
- North Oakland
- Piedmont.

This analysis assumed the location of T-1 at the Berkeley Landfill (approximately one mile distant from the site of the proposed project), the daily incremental additional haul costs to the T-1 transfer station (over and above collection costs) are as displayed below:

Albany	$ 40.00
Berkeley	420.00
Emeryville	10.00
North Oakland	1,180.00
Piedmont	70.00.

[Source: Medium- and Long-Term Solid Waste Facilities Plan: Alameda County Solid Waste Management Authority; October, 1978 (Tables E-7 & E-8)]

Although these estimates are based upon location of a transfer-only station situated at the site of the present landfill, they are not expected to differ markedly from those associated with the location of the proposed project.

The authors of the Draft EIR saw no meaningful utility in duplicating the defining of appropriate waste generation areas (service areas) for the proposed project which had already been accomplished for the Countywide Plan.

The Countywide Plan identifies three alternative locations for transfer station T-1:

1) At the Berkeley Landfill
2) At Fifth Avenue and Highway 17 (Oakland)
3) At the intersection of Highway 17 and 80 (Oakland).

The Berkeley Landfill site was eliminated from consideration because it has been dedicated to Park use (following completion of the landfill operation) and the SWMC is not considered compatible with this use. The Second and Gilman site was selected by the city, following evaluation of other sites within Berkeley, as the most preferable for a transfer station. Agreement to purchase the site was entered into by the city in anticipation of the city's participation in the ABAG sponsored "Bay-Delta Resource Recovery Demonstration Project", in 1974. Because the site was already under the city's effective control, and selection of a comparable site (within the industrial zone) would most likely involve

displacement of an on-going business, detailed analysis of alternative sites, for the proposed project, were not undertaken.

No analysis of sites exterior to the City of Berkeley was made because the original objective of the project was the development of a facility to satisfy the needs of Berkeley.

6) As previously stated, the original objectives of the proposed project were to accomodate the needs of Berkeley. The proposed project is the result of efforts, which commenced as early as 1971, to off-set effects of the projected closure of the Marina Landfill and the lack of suitable close-in alternative disposal locations. The Countywide Plan is a relatively recent development which was not made available until the engineering and planning of the proposed project were substantially complete.

Notwithstanding, a preliminary analysis of the facilities, recommended to serve Berkeley, indicated that they could be expanded to accomodate a facility on the scale of that conceptualized by the Countywide Plan to serve the Berkeley-North Oakland waste generation centroid.

In an effort to conform to the concepts of the Countywide Plan, the project was therefore modified as required.

The proposed project does have the potential to affect the Countywide Plan, primarilly, in the area of energy recovery characteristics. If the package incinerators of the SWMC prove viable, feedstocks to the energy recovery components of the Countywide Plan's Central Processing Facility would be reduced. This development would slightly alter the operational economics of the Countywide Plan; however, it is impossible to accurately estimate the scope of this effect until operational experience with the Package Incinerators provides the information needed to determine the facilitiy's ultimate capacity for energy conversion.

7) Comment acknowledged. See Foreward to the Final EIR.

8) The projected recovery rates are superior to those of the County Plan.

9) Comment acknowledged. The text of the final document has been modified to reflect this clarification.

10) Comment acknowledged. The oversight has been corrected in the final version.

11) Berkeley residents are surcharged 25% on their garbage bills to fund construction of the SWMC.

12) Present estimates are that 4,900 tons or 11.0% of the annual residential solid waste stream generated in the City of Berkeley is recycled: [Source: Berkeley Solid Waste Management Center Solid Waste Management Project Phase I Report (draft): G-E-Z-R; 1978 (p. 167)].

13) Comment acknowledged. The recommended language has been added to the final version of the EIR.

14) Comment acknowledged. Additional information on this subject has been added to the final version of the EIR.

15) Comment acknowledged. See additional information in Chapter V - Impacts.

16) Comment acknowledged.

COMMENTS OF THE STATE OF CALIFORNIA - DEPARTMENT OF FISH AND GAME

1) To alleviate a potential liability to fish and wildlife, we recommend that all caustic waste material, currently deposited at the proposed project site be removed. In addition, we recommend removal operations include testing of residual soil materials following excavation to determine if additional soil neutralization will be necessary to prevent off-site migration of caustics. This is especially important if stormwater drainage is to be discharged to the Bay. Without the appropriate chemical and leachate testing, there is no assurance that stormwater runoff would not be toxic or otherwise deleterious to fish and wildlife in violation of Fish and Game Code Section 5630.

2) We are further concerned that when the recycling center is operational, all petroleum products be confined to prevent contaminating stormwater runoff.

RESPONSE TO STATE OF CALIFORNIA - DEPARTMENT OF FISH AND GAME

1) The final decision on disposition of caustic lime materials,,present on the proposed project site, has not as yet been made. Testing of soil materials and groundwater adjacent to the site will be undertaken by the Engineers in subsequent phases of the planning process to determine if leachate migration from the site is occurring or is likely to occur if the materials are either left at the site or removed.

Depending on the findings of the Engineers, the materials may be: 1) left at the site and sealed from the surface by paving materials, 2) left at the site and sealed against leachate migration by slurry walls or other devices, or 3) removed from the site and replaced with imported soil materials.

The decision on disposition of these materials will be accomplished with the concerns of the Department uppermost in mind.

2) Comment acknowledged. Please see Response 2 to comments of the San Francisco Bay Regional Water Quality Control Board.

COMMENTS OF THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION (CALTRANS) DISTRICT 4)

1) Peak hour traffic generated by the proposed project may have a significant adverse impact on the traffic operation of the Gilman Street/Route 123 (San Pablo Avenue) intersection and Route 123.

2) On Page 44 - Mitigation Measures needed for Phase II - the first item is "reconfiguration of the Gilman Street/I-80 interchange. The DEIR does not explain why the interchange would have to be "reconfigured" or who would undertake the project. There is no traffic data for the interchange to justify the recommendation. No details are shown for the proposed reconfiguration.

3) The Flea Market or resale operations are not clear. Will this be a daily adventure or open for business perhaps on weekends only when heavy commuter and industrial traffic is light? Traffic volumes for the flea market activities are omitted.

4) The "Study Area" as shown by Figure III-9 is in error.

5) Being that the project site has frontage to railroad facilities, it seems that transfer transport does not need to rely solely on trucks. Is this not a potential mitigation measure for traffic operation impacts?

6) The mitigation measures cited are preceded by the word "could" which infers a suggestion rather than a recommendation. We believe mitigation suggested on page 42 (circulation) should be expanded to the facility when it is complete and operational rather than just the period of construction.

7) Caltrans cannot be committed financially for any mitigation measures that may affect the State highway right-of-way facilities or operations.

RESPONSE TO COMMENTS OF CALTRANS DISTRICT 4

1) Comment acknowledged. Please see pp. 35 - 37 DEIR.

2) It is acknowledged that the mitigation measure cited, together with the others suggested for Phase II, are conditional. Insufficient data is presently available to reliably predict which (if any) of the suggested mitigation measures would be required should the proposed project be expanded to the Phase II capacity (please see also new Forward in Final EIR). The interchange reconfiguration mitigation measure was based upon the speculation that SWMC-bound vehicles, from points outside of Berkeley, might elect to utilize the freeway route and, (based upon the interchange's present configuration) the potential for SWMC-destined traffic to block the easterly off-ramp during worst-case conditions.

3) The flea market's operational hours are projected to coincide with those of the SWMC; however, the market's heaviest use is expected to occur on the weekends.

4) Comment acknowledged. The error has been corrected in the final version.

5) Historically, the railroads have been most reluctant to transport municipal solid waste materials and have discouraged previous attempts to so utilize their facilities by setting freight rates for municipal refuse and/or residuals higher than those of other bulk cargos such as coal or grain. Moreover, railroad break-even costs, over truck hauling costs, usually involve distances of 100 miles or more; consequently, utilization of the nearby railroad to transport landfill-destined residues from the SWMC does not appear to be feasible at this time.

The mitigation measures cited are suggested. It is intended that the certifying resolution for the Final EIR will incorporate these suggestions as requirements.

The mitigation measures, found on page 42 (circulation), are designed for the construction period only and (with the exception of flex-time scheduling) have no practical application after the proposed project becomes operational.

7) Comment acknowledged.

COMMENTS OF STATE OF CALIFORNIA - SOLID WASTE MANAGEMENT BOARD

1) Facility Capacity and Phasing, Project Description, page 5. As a result of discussion with staff of the Berkeley Public Works Department, it is staff's understanding that the present project has been revised to include only the construction of a solid waste management center with a capacity of 360 tons per day (tpd). The Phase 2 project, an 810 tpd facility, has been eliminated

from consideration at the present time. Because of this understanding, Board's staff will not comment on references to the environmental impacts of the larger facility.

Staff believes that if an expansion of this facility were to be proposed in the future a supplemental EIR would have to be prepared before further expansion could proceed.

2) Project Summary and Impact Magnitude. While a summary is not essential to an EIR, staff recommends that for ease of impact identification, one be prepared for inclusion in the final EIR. A summary would greatly aid readers of the document and responsible agencies in identifying the significant environmental impacts of the project. In the report's present format, it is often difficult to discern which impacts the lead agency considers to be more important.

3) Quantification of Environmental Impacts. Throughout the subject draft EIR there is a lack of numerical quantification of impacts. Such subjects as project-induced air emissions, noise, traffic, water use, and energy consumption have not been discussed and reported as estimated numerical values. While it may be possible to design the facility to prevent problems in these areas, project planners and decision makers should be provided some idea of the size of each problem at the outset of the design process. Board staff recommends that additional efforts be made to measure or estimate the size of project impacts.

4) Operational Characteristics, page 9, paragraph #2. The present discussion of incinerator abandonment does not include any estimate of the size of the impacts generated by such a change in facility operation. Discuss briefly what this change will mean for truck emissions, energy consumption, facility operation changes, and disposal costs. Also, consider the possibility of having to use a landfill for disposal instead of another energy recovery facility.

5) Operational Characteristics, Table II-1. The EIR guidelines recommend incorporation of relevant information by reference, as has been done with this table. The guidelines also state that such incorporated documents should either be made available for review along with the EIR or summarized in the text. Staff believes an explanation of the basis of this table should be provided as an appendix or summary.

6) Operational Impacts, Traffic, page 35. Traffic impact section is inadequate. No estimates are given for traffic delays caused by trucks entering and leaving the proposed facility. Also, the location of the facility apparently conflicts with a proposed bicycle pathway. Please provide in more detail justification for the conclusions that traffic will not cause a significant environmental impact and describe how the conflict with the bicycle pathway will be resolved if University Avenue cannot be used.

7) Operational Impacts, Noise, page 37. Numerical estimates of anticipated noise levels resulting from the operation of the proposed facility are inadequate. Statements such as "this noise is expected to be confined on-site" should be supported by real data. Without additional noise data, it appears highly questionable to conclude that no significant noise impacts will be generated. Please provide such information in the Final EIR.

8) Operational Impacts, Land Consumption, page 39. Describe the amount and type of ash that will require disposal. Also identify where such ash will be taken for disposal and identify any problems associated with costs or mechanics

of ash disposal.

9) Operational Impacts, Parking, no page number. The draft EIR states that the subject transfer station location is now used for off-street parking. Discuss the impacts of this loss of parking on the project area. Also, what facilities are being provided for employee parking?

10) Mitigation Measures, Operational Impacts, page 42. Staff notes that the mitigation measures identified in the draft EIR are only "recommended." We believe the final EIR should clearly note that while mitigation measures are only recommended, significant adverse environmental impacts could and probably will occur if the lead agency does not adopt these measures as part of the project. Staff makes this point because, while the mitigation measures listed in the text appear adequate to prevent significant environmental impacts, they are useless if not adopted and enforced.

11) Alternatives, Chapter VI, page 46. Alternatives chapter should be expanded to include more possibilities than has been presently considered. Staff believes that at least two other alternatives should be examined: alternative locations for the facility; and a source-separation/curbside pick-up citywide collection system. A brief analysis of these alternatives should be included in the final EIR.

RESPONSE TO STATE OF CALIFORNIA - SOLID WASTE MANAGEMENT BOARD

1) Comment acknowledged. Please also see new Forward in Final EIR.

2) Comment acknowledged. A summary was prepared but inadvertently not bound in several copies of the first printing of the draft. This oversight was corrected and a copy of the summary made available to those requesting it.

3) Numerical values for air emissions and water use characteristics of the modular incinerators were not included in the draft EIR because of a lack of independently gathered operational data. The authors of the EIR felt that the use of manufacturer's data for the operational characteristics might contain various biases; moreover, it was known that studies were underway to independantly evaluate operational characteristics of modular incinerators. and that various regulatory agencies (i.e. BAAQMD and RWQCB) would ultimately have to issue permits or licenses based upon a rigorous technical evaluation of data which would be useless to most local decision-makers. Therefore this data was not included in the draft EIR.

Since the publication of the draft EIR, a comprehensive (and independent) study of the operational characteristics of modular incinerators has been completed [Frounfelker, R., U.S. EPA: Small Modular Incinerator with Heat Recovery: A Technical, Environmental, and Economic Evaluation, Cincinnati, OH, 1979]. The final version of the EIR has been revised to display some of the numerical values of these potential impacts as reported by the above referenced study.

4) It is estimated that the modular incinerators would reduce 44% of the received waste stream by half; therefore, abandonment would have the potential to generate an approximate 22% increase in over-the-road truck operations (either to landfill or to a regional energy recovery center). Disposal costs could increase by a similar amount if it were decided to landfill the potential RDF fraction of the waste stream rather than transport it to a regional energy recovery center.

Energy consumption characteristics of the SWMC are not expected to be sensitive to incinerator abandonment unless it were decided to operate the facility in the Transfer Station Only mode (see Alternatives Chapter).

The remaining SWMC components are independent of the energy conversion component and should not be affected in the event of incinerator abandonment.

5) The referenced Table is from the SWMC Phase I Study conducted by Garretson, Elmendorf, Zinov, and Reibin. This report was made available for public review during the comment period.

6) Estimates were not provided for traffic delays caused by SWMC-bound vehicles during Phase II because there is no known way to accurately project the arrival/ departure times and routes of these vehicles.

The report did not conclude that traffic would not pose a significant problem. On the contrary, the report states: "...traffic impacts...are expected to be severe" (page 35). It is true that the SWMC would conflict with an existing designated bicycle path. Given the obvious hazards associated with this conflict, it is reasonable to expect that the path would be re-routed around the SWMC even if the Universtiy Avenue mitigation measure (outlined by the EIR - see Mitigation Measures) were not undertaken.

7) This data has been included in the final EIR. See also response to comment 3.

8) Approximately 22% of the incoming waste stream would be reduced to ash or residue which would then be disposed of by landfill. It is not presently clear (however, it is very likely) that system residues will require disposal in a Class I landfill.

9) The impact, associated with construction-related loss of parking is the reduction of available parking spaces within the affected area. This will result in increased competition for available spaces and could ripple into nearby neighborhood areas.

The conceptualized facility would provide parking spaces for employees and facility visitors. See also Figure VIII-1 which follows.

10) Comment acknowledged. Please see also response to comment 6 of CALTRANS.

11) The proposed project site was originally purchased by the City in anticipation of the City's participation in the Bay-Delta Resource Recovery Demonstration Program [See: Solid Waste Management Implementation Project (Vol. II, p. 43); ABAG, Dec., 1973].

Prior to the purchase, the City's Department of Comprehensive Planning surveyed alternative sites within Berkeley including the West Berkeley Industrial Park and the existing landfill site. These studies conclude that a transfer station, located within the City, should be situated within the existing industrial section (zoned M - Manufacturing); however, it was inconsistent with the City's planning objectives to purchase a site which would occassion the displacement of on-going industries.

The proposed site met the City's selection criteria (i.e.: within an area zoned M, having suitable access for large vehicles, reasonabley remote from residential areas, and not requiring the displacement of active business); therefore, the

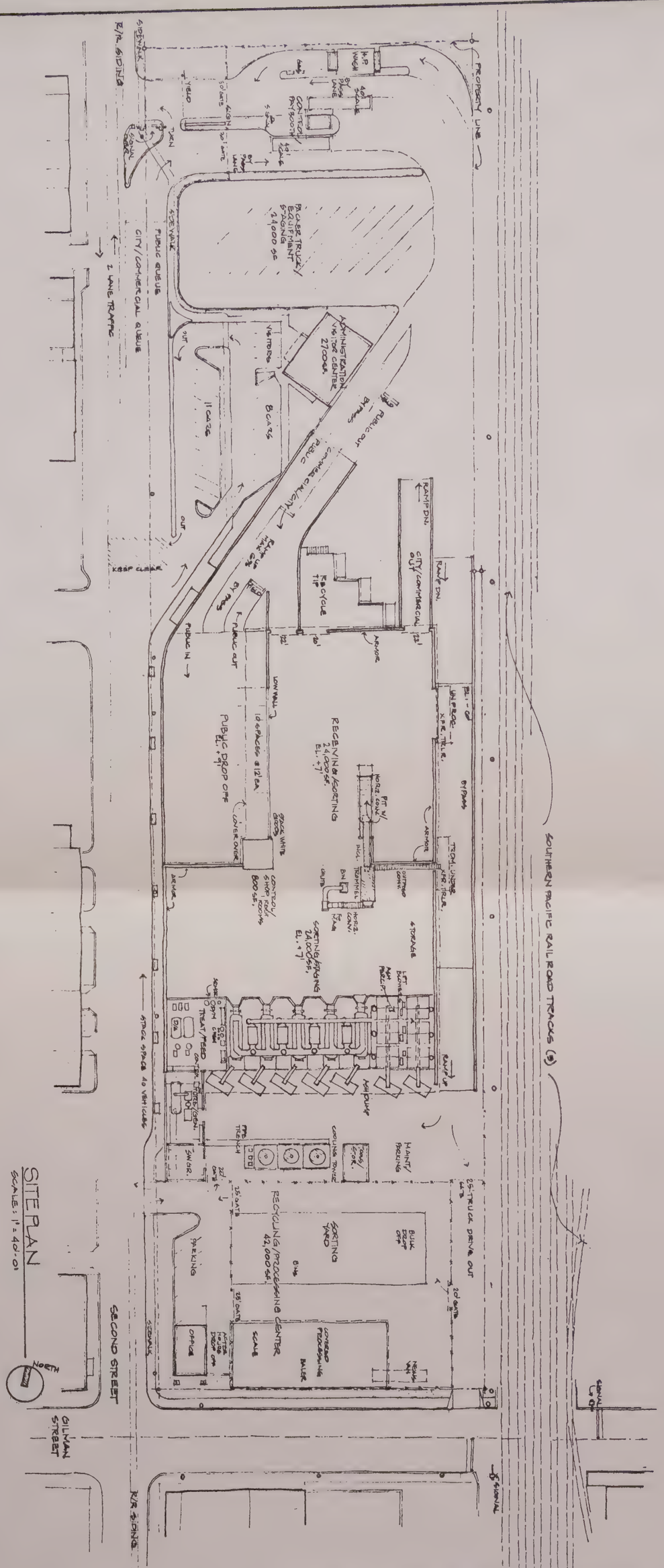

FIGURE VIII-1

GARRETSON • ELMENDORF • ZINOV • REIBIN ARCHITECTS AND ENGINEERS 124 SPEAR ST., SAN FRANCISCO, CA 94105 • TELEPHONE 415-434-3838	SOLID WASTE MANAGEMENT CENTER CONCEPTUAL DESIGN CITY OF BERKELEY			DATE: 29 FEB 80 SCALE: 1" = 40' DESIGNED BY: ET AL DRAWN BY: RAWB CHECKED BY: JDL	SITE PLAN	DRAWING NO. A4
		REVISION	DATE	JOB NO. 1671		OF SHEETS

City entered into agreement to purchase the site.

Because the site was already under the effective control of the City, and the proposed project's use was essentially the same as that conceptualized for the Bay-Delta Program, no additional comprehensive survey of candidate alternative sites was undertaken for the proposed project.

It is important to remember that the document under review is for the SWMC facility and not the City's Solid Waste Management Policy. The facility's primary objective is its transfer station function which would be required even if a source separation/ curbside pick-up program were 100% effective. The use of modular incinerators does not commit the City to the incineration of waste stream fractions forever. In fact, the major attractiveness of these units is that they reserve to the City maximum flexibility to respond to changes in the waste stream by either purchasing more units, selling excess units, or abandoning the energy recovery component entirely.

COMMENTS OF THE SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)

1) Drainage from the transfer building and truck-washing area should be connected to a sanitary sewer system.

2) Adequate measures should be taken to insure that there would not be accidental discharge of oil from the waste storage area. We recommend that one or both of the following suggestions be incorporated:

a. Berm the oil storage area with a roll-over curb if needed

b. Keep the barrels closed at all times or cover the area to prevent rainwater from entering the barrels causing a discharge of oil

c. Locate the oil storage area well away from storm drainage inlets.

RESPONSE TO THE SAN FRANCISCO BAY RWQCB

1) Comment acknowledged. This recommended mitigation measure has been included in the final EIR.

2) Comment acknowledged. These recommendations have been included in the final EIR.

COMMENTS OF THE BERKELEY SOLID WASTE MANAGEMENT COMMISSION

1) On page five (5) the draft EIR state the "objective of the proposed project is the construction of a Solid Waste Management Center (SWMC)...for an ultimate daily throughput of 810 tons," and cites the County's Waste Plan. The report adds that the project will test the feasibility of the modular incinerators which produce steam from refuse. The proposal is then termed a "phased project" where Phase I would accomodate Berkeley's waste up to 360 tons per day (tpd). As the Commission understands the project, the stated objectives are backward and inaccurate. The primary object [SIC] is to build a 360 tpd facility to handle Berkeley's waste and then to test the modular incinerators. Then, if these incinerators proved successful, the project could be expanded to accomodate a portion of the county's wastes by use of this method.

2) What exactly is being approved? At this point in time, it appears we are still researching the markets for steam in the site area. No decision to proceed with the package incinerators for either sized facility will be made until the results of this study are in. At this time, the City should consider whether to proceed with a 360 tpd facility only, reserving decision on a larger facility for a time when the first stage has had sufficient time to demonstrate its success or failure.

3) The DEIR claims the proposal is a "phased project" but the regulations say that "where individual projects are, or a phased project is, to be undertaken," there must be an EIR for the ultimate project [14 Cal. Admin. Code; Section 15069]. Unless approval of a 360 tpd facility commits the City to the larger facility, the EIR should not be worded so as to make the larger facility the primary subject of the report. This is not to say the EIR should overlook the possible future expansion. CEQA requires consideration of the long range effects of a decision and one effect of approval for a 360 tpd facility is to make the site attractive for location of the larger County facility. Thus, the EIR should, as far as possible, address the potential impacts of the larger facility in order for Berkeley to approve the smaller one.

4) Use of one strategy to deal with waste problems can impede the growth of recycling efforts already begun and possibly set them back. Deliberate intensification of such efforts can also be viewed as mitigating resource and energy consumption and lastly can be considered as an alternative to energy conversion. There is no analysis or comparison with the lost fuels and resources necessary to manufacture new products from virgin materials.

5) There is not a catagory in the draft EIR for resource management impacts. In most castes, it takes more steps to manufacture items from basic resource components than from recycled materials which are already closer to the composition of the product being manufactured. Each step requires energy and engenders inefficiencies resulting in further losses.

To the extent that Berkeley's project may interfere with the growth of recycling by altering market forces, or may preclude future governmental efforts directed at recycling, it is causing an adverse impact on resource management.

6) The Phase II expansion to 810 tpd could require the closure of the recycling center, storage depot, public access, and presumably any drop-off area for a curbside collection program. These impacts have not been considered.

7) Energy conversion plants may be a trend in waste management to which Berkeley would be contributing. San Francisco and Alameda are each building energy recovery systems and if more and more cities choose to convert wastes to energy, while neglecting to pursue intensive recycling options, there will be less likelihood that new markets for recyclable materials will arise. This potential impact has not been analyzed.

8) It is assumed, that since the package incinerators are expected to be within Federal emission standards, there are no adverse air quality impacts unless under abnormal operation (p. 38). This is simply wrong. First, the EPA does not regulate many toxic pollutants and some of these might be expected in burning such a mixed fuel as garbage. In other words, limited EPA resources have been directed at adopting regulations for pollutants likely to result from more traditional fuels; however, city garbage contains vinyl chlorides and other toxic

plastics.

9) The Bay Area is considered a "Non-Attainment" area under the Clean Air Act. Therefore, any source must comply with the New Source Review Rules as adopted by the Air Quality Management District. The importance of this is demonstrated by the fact that municipal waste incineration may release nitrogen oxides and particulates that exceed the new source review limits for the size of the facility to be constructed.

10) If an 810 tpd facility is built in Berkeley, City residents will suffer the landward blown pollution from burning the County's garbage. Since the package incinerators are module units, perhaps they should be spread around more to spread air quality burdens as well as benefits. Would that not also save costs due to shorter average hauling distances? It seems obvious that information derived from the Berkeley 360 tpd operation may make revision or reconsideration of the County Plan adviseable.

11) The report does not examine any other communities that employ successful curbside collection and other experimental programs. There is no independant examinations of the amounts of materials that could feasibly be retrieved now or in the future.

12) Feasible recycling options should have been covered in substantial detail in a project so directly connected with such issues.

13) No emission-reducing measures are noted in the drraft. With regard to the report's expectation that the project will not violate Federal standards, we point out that just because we are allowed to pollute the air does not mean we have to.

14) Besides considering technology to reduce emissions, the report might note the possibility of legislation to prohibit the use of certain types of plastics as some burn clean and others do not. As more and more chemicals are discovered to pose serious health hazards, such regulation could become absolutely necessary to prevent Berkeley citizens from breathing toxic compounds released by garbage incineration.

15) The report states that the project "will reduce the current rate of consumption of irreplacable and diminishing fossil fuels (p. 40). There is no analysis or comparison with the lost fuels and resources necessary to manufacture new products from virgin materials. It is true that steam produced may have local economic and energy benefits but CEQA requires consideration of "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity."

If glass and cans are not recovered from the waste stream, much energy and resources will be lost in producing new glass and cans via mining and smelting etc.. Similarly, if lesser amounts of recyclable paper and cardboard are removed from the waste stream before burning, then more energy may be required to make paper products from virgin pulp sources. This may amount to far more energy than is released and actually captured by burning garbage.

16) Page 4. County Solid Waste Management Plan recommends the construction of transfer facilities that would utilize energy and resource recovery practices. "Such facilities would separate ferrous and non-ferrous metals, re-usable fibers, glass, and other materials for which adequate markets exist. They would apply

the most feasible proven technology to this problem." It is important to note that the proposed SWMC would not necessarily employ the most feasible nor the most benign technology available.

17) Page 4. "The proposed project would most likely be constructed in two or more phases. Phase I would be designed...for a 360 ton per day throughput." Phase II would be designed for an 810 ton per day throughput. According to the (draft) EIR, the city produces only 200 tpd of garbage including construction debris and other materials that would not be handled by the SWMC. Why should we design for such a large facility - especially if the city is supposed to cut back in its solid waste generation by 25% as requested by the State Solid Waste Board? Will the construction of such an oversized facility create a need for garbage in order to keep operating costs (on a per ton basis) down?

18) Page 6 and page 10. Phase II expansion could eliminate the recyling center, flea market, resource storage depot and public access. The result of this action would have a severe impact on recycling operations in the city of Berkeley and on the operational costs of local, low budget haulers and on independent gardeners and builders. Since the markets for materials that go through a recycling center are much better than the markets for materials that are mechanically processed, wouldn't it be wiser to expand the facility in size rather than reduce the number of functions? The SWMC is an ideal location for a recycling center because of the great potential for diverting resources from the "pit." Materials recovered by mechanical processing are sometimes contaminated, redering them less marketable and perhaps necessitating their disposal.

Lost also would be the flea market which would not only yield prices much higher than the scrap value of resources but would also have the potential for creating jobs in the community as well as providing people with low-cost reusable goods.

19) Page 7. "It is conceivable that the modular package incinerators may not meet (California air emission standards) [SIC] or would require additional air pollution control equipment that would render them economically infeasible. Should this occur, it is likely that they would be abandoned." The discussion of such a possiblity is all too brief. What is the probability of such difficulty and what are the economic impacts of either not incinerating or of using air pollution controls. Some estimates for including adequate air pollution controls have increased the net operational cost by 50%.

20) Table II-1. Why should the market value of newspaper and cardboard change from $40 per ton using curbside pickup? By using labor intensive separation of high-grading metals and other items, much more revenue can be derived from a recycling center. For example, by removing motors and non-ferrous metals from white goods, one can get a higher price per ton. This is because white goods are basically mixed metals which bring a relatively low market value. However, once the different metals are separated out, the value per ton of white goods becomes many times greater. A high-grading project in Lane County Oregon proved successful and economically feasible.

Table II-1 implies that curbside pickup and a recycling center would compete. Actually, the two could complement each other quite well. For example, the most convenient method of recycling cans, glass, and newsprint would be through a curbside pickup program. However, many people would want to participate in a buyback program for aluminum cans. Therefore, while a buyback program at

the recycling center would be the most efficient way of recycling aluminium, curbside pickup is likely to be the most efficient way to recycle other household refuse.

21) Page 9. "...(the) heavy fraction (metal cans, glass, wood, dirt, etc.) would drop to a horizontal rubber belt conveyor and are delivered to a magnetic removal system where the ferrous and bi-metal cans are removed for subsequent transfer to the storage area. The residue would proceed to the stationary compactor and then to the loading facility where it would be transported via haul vehicles to a designated landfill." One must remember that ferrous and bi-metal cans sorted mechanically are highly contaminated and have a low market potential.

According to the DEIR it is the light stock which is burned. What is the estimated BTU value of the light fraction? Table II-3 estimates the BTU value of total refuse at 4,500 BTU/lb. but what about the energy value of the feedstock?

22) Page 9. "The plus or light fraction...would compose the feedstock for the modular package incinerators or, if they fail to meet emissions requirements and are abanconed, would be transported to a regional energy recovery facility." If the package incinerators didn't work in Berkeley, how can we assume that any other energy recover facility wouldn't have similar problems?

23) Table II-3. Does Table II-3, Item C, net system (energy) output, reflect the energy given off as heat, steam, or electricity: As energy is converted from one form to another, much is lost to the environment. Additional energy is lost through transmission. For these reasons the figure for Item C may be misleading. For example, converting heat to steam may reduce the amount of energy left in the form of steam by 50%. More energy would be lost by transporting the steam over relatively extended distances.

24) Page 10. "The existing caustic lime pit would probably be excavated and the material removed for sale and subsequent distribution to agricultural interests for soil neutralization purposes." Is it known that the lime is safe for such use? May it be contaminated? What is the alternative method of disposal if one becomes necessary?

25) Pages 26 & 27. According to calculations derived by information supplied in the DEIR, the city refuse collection system handles approximately 2.5 lbs./day per person. According to other information, the dump receives around 4.8 lb./day for every person living in Berkeley. Where does the figure (p. 27) for solid waste generation of 3.9 lb. per person come from? What classes of materials are included and which are excluded from this accounting system? Shouldn't materials that are going to be recycled be considered separately if they are not going to be processed through the SWMC? Per capita solid waste generation estimates for Berkeley...are projected to be 4.3 lb./day in 1985 and 4.7 lb/day in 1995." Assuming that these estimates are justified, they nevertheless seem to ignore the potential of increased resources recovery through recycling. Also ignored, was the possiblity of reduction of solid waste generation through legislation or public awareness campaigns.

26) The possibility exists that the energy recovery aspect of the SWMC would compete with various forms of recycling. This type of competition would be especially noticeable if the SWMC were operated by a private firm, but will, nevertheless, be evidenced no matter who operates the facility. A private operator would probably make the city sign a "put or pay" contract in which the city

would pay for 360 tpd of refuse processing and disposal whether or not that much was received. This would provide the city with incentive to provide as much garbage as possible. The fact that the recycling center has not been given enough attention thus far; that it is slated for elimination and the fact that curbside pickup is not discussed, indicates that the incineration and recycling options are already competing.

27) Pages 28 & 29. Some of the policies of ABAG merit further discussion. Specific policies which should be more completely considered are the proposed establishment of public education programs, the creation of adequate markets for secondary materials, and the development of source separation programs. For example, the establishment of a source separation program would not only have an impact on recycling of material in Berkeley but could have an impact on the efficient design and operation of the SWMC. Because resource material would be removed from the waste stream and the SWMC could be designed to process a smaller quantity of garbage but to store a larger quantity of recyclables. More importantly, materials such as glass, which are harmful to processing and incinerating facilities, could be removed from the waste stream, to a large extent, by source separation.

28) Page 31. "The (Bay Area Air Pollution Control District) would have to issue a permit for construction and a permit for operation of the incinerator component of the project." Consider the lack of data concerning air emissions performance of modular package incinerators and the potential that these devices have for releasing heavy metals and toxic gasses into the atmosphere.

29) Page 33. In the chapter on environmental impacts, the reader will again read that: "Phase II construction activities would involve...possible relocation or elimination of some Phase I facilities such as the recycling area and the flea market." Despite this mention the DEIR does not consider any of the broad environmental impacts nor the secondary economic impacts of such an undertaking. The purpose of this DEIR should not merely be to describe the environmental impacts of the physical presence and operation of the SWMC. The DEIR should be considering the environmental impacts of different forms of resource use and allocation as they pertain to the enactment of a solid waste management plan in the city of Berkeley.

30) Page 35. Although the DEIR acknowledges that the presence of the SWMC would have a severe impact on traffic in the area of Second and Gillman Streets, it has overlooked some critical points. First, when Golden Gate Fields is in operation, the traffic in the area is severely hampered by vehicles turning onto and off of feeders that run perpendicular to Gillman. The presence of a SWMC in the area would have a much greater impact on the traffic of the area as a result of vehicular traffic turning on and off Gillman Street than it would through the net addition of traffic to the area.

31) Page 37. The note to Table IV-3 is entirely speculative and without basis. The Table itself is an estimate of traffic volumes given the eventuality of an 810 tpd facility. The note attempts to readjust the estimate downward. "This analysis somewhat overstates the case. If the SWMC proves to be inconvenient and is characterised by long lines...it is likely that many private citizen-disposers will elect not to use the facility." Where would these people go? Many people who use the Berkeley dump come from surrounding communities because it is the closest alternative. Berkeley residents use the dump because it is the

only viable alternative. Closure of the dump to public access would likely increase the incidence of illegal dumping on vacant lots and on public property, thereby aggravating Berkeley's rat problem, creating public health problems and causing a deterioration of aesthetics and increased traffic flow to other dump sites.

The note to Table IV-3 also states: "Finally, it is quite conceivable that commercial haulers would elect to utilize vehicles with superior capacity characteristics than those presently utilized and thereby reduce the number of vehicle operations required to transport a given amount of refuse." This statement is unrealistic. Other haulers could not operate larger vehicles economically because of the limited scope of their operations. Most haulers are using the largest vehicles that they can afford and would not opt for larger ones simply to ease traffic congestion at the SWMC.

32) Page 38. In the discussion of air quality impacts, the DEIR states that there is not (at this time) enough concrete data on the emissions of modular package incinerators: "As of this writing, only manufacturer's data is available on the emissions characteristics of package incinerators." It is quite likely that the incinerators may not meet state standards by themselves and would require air emission control devices. The cost of such devices may drive the cost per ton operation of the SWMC up by at least 50%. Even supposing that air quality standards could be met, there are various substances that would be put into the air that are not regulated. Chief among these are heavy metals such as lead and cadmium.

33) Page 39. The section on water consumption and wastewater generation should contain some discussion of wastewater volumes and quality of the wastewater discharged. The bulk of discharge from the SWMC would come from facility washdown, vehicle washing, ash quenching, boiler blowdown, and sludge (if scrubbers are used). In view of what is known about the chemistry of such effluents and their toxic effects and impacts on municipal sewage treatement facilties, it is conceivable that wastewaters may require pretreatment at the facility. Also, will the returning steam condensatate require treatment?

34) Pages 39 & 40. The draft EIR states: "Steam, which would be sold to nearby users, is currently produced almost entirely from fossil fuels. Additionally, the proposed project would reduce haul distances for Berkeley's fleet thereby conserving the use of fossil derived fuels. The steam produced would represent use of a fuel source that is currently wasted and would reduce the current rate of consumption of irreplacable and diminishing fossil fuels. The DEIR does not indicate that the proposed SWMC would not reduce the current rate of consumption of other irreplacable and diminshing resources and would not reduce the rate of consumption of fossil fuels as much as recycling would. The burning of resources constitutes a loss of resources. The regional implications of burning garbage also constitute an energy loss because more energy is required to manufacture products from virgin materials than from secondary materials. This energy differential amounts to much more energy than could ever be produced by incineration of recyclables.

35) Page 40. The assessment of human health and safety impacts of the proposed project ignore explosion potential and risks to health as a result of exposure to dust, toxic, and carcinogenic materials.

36) Page 43. Mitigation measures intended to ameliorate air quality impacts include, "Rapid handling of refuse masses...(and) temporarily halting use of package incinerators during periods of malfunctions and transporting all refuse to landfill sites." The poor record of equipment reliability at some sites indicates that the goal of rapid handling may be unattainable or costly. If it is ever necessary to close down the incinerator either for the short term or permanently, the city would be in the position of having to long-haul garbage at great cost. The lack of alternatives, in this instance, is a major weakness of the proposed SWMC and of the DEIR.

37) Page 44. The addition of left turn lanes in the vicinity of the SWMC may help mitigate traffic impacts.

38) Chapter VI - Alternatives. The alternative section gives no rationale as to why the incinerator-steam generator alternative was taken. There is no mention that the front end costs of preparing and using the feedstock would be cheaper than for other, more technologically complex alternatives. There is no mention that the modular nature of the incinerators will allow the city to experiement with the system thereby saving the city money if the system does not work. The DEIR does not mention that one reason this system was selected is that, because of its modular nature, some incinerators can be shut down for maintenance while others may remain operating.

Why doesn't the low technology alternative discuss the potential of source separation. The low tech discussion in the DEIR only talks about materials recovery of items that have been seriously contaminated in the waste stream. According to the EPA "Source Separation accounts for 90% of materials recovery from solid waste." Why has the DEIR spent so much time considering costly, non-practicable, high-technology "alternatives" when it could take the time to discuss a labor intensive source separation system that is in wide usage? One possible reason for including such space age alternatives is to make an incinerator look eminantly practical by comparison. The proposed SWMC should be expected to stand up on its own.

39) Page 57. The DEIR states: "There are no significant effects of the proposed project which cannot be reduced to levels of community acceptance through use of proposed mitigation measures." Because of insufficient available information and inadequate discussion of various impacts this conclusion is largely speculative.

RESPONSE TO COMMENTS OF THE BERKELEY SOLID WASTE COMMISSION

General Response

A major thrust of the Commission's comments is directed toward the propriety of discussing the SWMC's Phase II characteristics at the same level of emphasis as Phase I facility characteristics (see Appendix A). When the DEIR was published, the Alameda County Solid Waste Management Plan called for a transfer station/ resources recovery center with an 810 tpd capacity to serve the Berkeley-Albany-North Oakland service area; however, the County's Plan has since been scrutinized very carefully and is likely to be revised in the very near future to include the Berkeley SWMC at a 355 tpd maximum capacity (see also Forward to the Final EIR).

A very important function of the environmental documentation process is the public review component wherein public opinion often effect the modification of proposed projects, programs, plans, etc.. Such has been the effect of public review on this project; however, the authors of this document disagree with

the assertions of the Commission in that we feel it was necessary to focus attention on what was (under the original County Plan) to ultimately have been an 810 tpd facility. Further, we feel that to have downplayed this eventuality or to have presented the larger facility in terms of reduced emphasis would have circumvented the intent of CEQA's public review component and would not have afforded the public an opportunity to voice their concerns regarding the larger facility.

We agree that a supplemental environmental document should be required prior to any future expansion of the SWMC because many of the impacts, associated with a facility of 810 tpd (at the site of the proposed project) are not presently clear; however, this data paucity does not excuse the requirement to address an expanded Phase II facility to the best of our current ability.

The concerns expressed by the Commission and citizens of Berkeley, regarding the Phase II expanded facility, are certainly valid and we are pleased that the DEIR served as a focal point for the expression of these concerns which we feel confident will lead to the eventual modification of the County Plan.

Specific Responses

1) Comment acknowledged. Please see: 1) the General Response above, 2) the Forward to the Final EIR, and 3) the revised Chapter VII-Alternatives.

2) Comment acknowledged. Please see General Response.

3) Comment acknowledged. One very real effect of the approval and construction of the Phase I (360 tpd) facility would have been to enhance the site's attractiveness for the 810 tpd facility originally proposed by the County's Plan.

4) That portion of the solid waste stream received at the proposed SWMC destined for incineration (energy recovery) would consist chiefly of paper and organic garbage constituents. The authors are advised that the energy recovery component of the SWMC would be feasible even if all newsprint, office paper, and cardboard were removed from the waste stream at any point (i.e. on-site or through source-separation techniques). The remaining paper would consist of packaging materials which are considered impractical to recover at this time. [Source: Conversation with M. Baumann, Project Manager - Berkeley Solid Waste Management Program; January 14, 1980]

The following Table displays the environmental implications associated with the use of recycled materials for the production of paper products rather than production from virgin materials.

5) It is acknowledged that more steps are required to manufacture most items (particularly metal and paper products) from virgin resources than are required for production from recycled materials.

The DEIR did not address resource management impacts because the document was intended to address the impacts of the SWMC facility. Nevertheless, the SWMC's conceptual design is such that alternative resource recovery strategies are not precluded.

It is difficult to imagine how the SWMC's resource recovery components, which would include cardboard and bi-metal can recovery, would meaningfully alter existing or future markets to such an extent that alternative resource recovery strategies would be precluded.

6) Comment acknowledged. Please see Forward.

7) Comment acknowledged. Please see revised Chapter VII-Statutory.

8) Such an assumption was not implied nor intended. The purpose of calling attention to Federal and State Ambient Air Standards was to illustrate the role of Federal, State and Regional agencies in protecting ambient air quality. Federal Ambient Air Standards are divided into two (2) categories: primary standards, designed to protect human health with an adequate margin of safety; and secondary standards, designed to protect the public welfare from known and anticipated adverse effects of a pollutant. While it may be accurate to state that EPA does not regulate all air pollutants, the Administrator of EPA is authorized and compelled to regulate those which can be demonstrated to: "cause or contribute to an increase in mortality or an increase in serious, irreversible, or incapacitationg reversible ilness" [Clean Air Act (42 U.S. Code, 1857 et seq.)]. Significant EPA resources are currently directed toward the evaluation of emission characteristics associated with the incineration of municipal refuse streams. If this research results in the discovery of health-threatening pollutants associated with the incineration of this feedstock, it is reasonable to expect that existing ambient air standards will be expanded to include requirements for these pollutants.

9) Comment acknowledged. The DEIR makes no attempt to predict the action of the Bay Area Air Quality Maintenance District (BAAQMD) which is the successor to BAAPCD. The District could: 1) refuse to license the incinerators, 2) license them on a probationary performance basis, or 3) remove their license or require additional emissions control equipment in the future based upon the development of new Federal or State standards.

The commentors seem to infer that air quality standards are cast in concrete. They are not; and as science learns more, regarding the effects of various air pollutants, new standards will be developed.

10) This alternative might have some practical application if one were willing to sacrifice the resource recovery potentials of the SWMC. It should be noted that the Engineers estimate only 44% of the incoming waste stream to the SWMC would ultimately be incinerated (see Table II-3).

11) The scope of this document is intended to address the SWMC facility only; however, such an analysis was undertaken by the Engineers for the purpose of sizing the proposed SWMC (see: Solid Waste Management Center - Phase I Report; G-E-Z-R. June, 1978).

12) Please see previous response.

13) Emissions reducing measures were not recommended because at the time of publication of the DEIR only manufacturer's data, regarding the air pollutant generation characteristics of the incinerators, was available. Please also see response 8 (this section) and Response 3 to comments of the State Solid Waste Management Board.

14) Please see Responses 8 & 9 this section. The Administrator of EPA is empowered to promulgate source control measures designed to prohibit materials, demonstrating life-threatening emission characteristics, from reaching the solid waste stream and thus incineration. Local ordinances, designed to achieve such an objective, have not proven effective in the past.

15) Comment acknowledged. See also Response 4 this section.

16) The proposed SWMC employs, what is in the opinion of the Engineers, the most feasible technology for Berkeley's solid waste management environment.

17) It is not clear if the commenters' inquiry is directed toward the sizing of the Phase I or Phase II facility. Phase I sizing was accomplished by multiplying projected per capita generation factors by what is anticipated to be future growth and the 1995 service area population projections. Phase II sizing was defined by the County Plan and was accomplished in much the same manner for the proposed service area which included: Berkeley, North Oakland, Albany, Emeryville, etc.. Please also see new Table III-5 in Final EIR.

18) Theoretically, it would be prefferable to expand the listed facilities; however, it does not appear feasible to accomplish this objective within the confines of the project site given an 810 tpd throughput. Please also see the Forward to the Final EIR.

19) When the DEIR was written, only manufacturer's data was available on air pollution emitting characteristics. Since then, independent data has been developed which indicate that the modular units can meet State and Federal standards with pollution abatement equipment that does not render them economically infeasible. Please also see Response 3 to comments of CALTRANS.

20) Table II-1 assumes the volume of newspaper retrieved through a curbside pick-up program would justify the purchase and use of a baler. The market price for baled product is higher than that for loose product.

21) It is assumed the Btu value of the feedstock would equal 6,500 Btu/lb. minimum.

22) It is assumed a regional energy recovery center would enjoy superior economies of scale and, thereby reflect comparatively lower costs per ton for pollution abatement equipment. Moreover, it is likely, such a facility (regional) would utilize technology differing from that associated with the package incinerators.

23) Item C reflects the Btu value of the steam output.

24) Subsequent research, concluded since the publication of the DEIR, casts some doubt on this assumption. It is very likely no attempt will be made to remove the lime.

The lime can be assumed to be safe for agricultural neutralization purposes based upon the fact that it has historically been utilized by valley farmers for this purpose. However, the lime, now present on-site, has been so contaminated with soil materials that its commercial value is drastically reduced. It is very probable that the lime has value (to valley farmers) only if it is free; however, rising transportation costs render its value questionalbe even if it is free.

25) As stated by the DEIR, the 3.9 lbs/per day/per capita estimate was extracted from the Medium- and Long-Term Solid Waste Facilities Plan [Alameda County Solid Waste Authority, Oct., 1978]. These figures are generation factors and do not necessarilly relate directly to solid waste material which ultimately would pass through the SWMC; therefore, while intensive recycling efforts could reduce total wastes through the SWMC, they would not (of necessity) effect generation factors.

The question of reducing Berkeley's solid waste stream through legislation was not addressed by the DEIR because the authors were of the opinion that this issue would be more properly addressed in an environmental evaluation of the City's over-all Solid Waste Management Policy; moreover, the SWMC's facilities do not preclude the development or desirability of such legislation.

26) The modular nature of the incinerators conceptualized afford the City maximum flexibility to insure that such competition does not take place. Currently, the City is participating in a demonstration source separation/curbside pick-up program which if successful, could be expanded. Through this program, the City will obtain current and practical data and experience to apply to the task of deciding how many incinerators should be initially ordered.

27) Comment acknowledged. Development of the SWMC does not preclude adoption of such policies. As indicated by the DEIR, glass would be removed from the process stream prior to incineration. We agree, the most logical and economically feasible method to recycle glass is through a source separation program.

28) Comment acknowledged. The San Francisco Bay Area Air Quality Maintenance District would have to take these matters into consideration during their permit processing.

29) It is now generally agreed that Phase II development of the SWMC would require completion of a subsequent EIR; therefore, it appears prudent to defer analysis of these potential impacts until a decision to proceed to Phase II is made and the required environmental document is prepared.

30) Comment acknowledged. This point has been included in the Final EIR.

31) The note to Table IV-3 was not intended to demphasize the potential traffic impacts associated with the SWMC. It has been corrected to more accurately reflect the author's intent.

That portion of the comment which relates to the potential increase of illegal dumping as one impact associated with the landfill's closure is acknowledged; however, if the Phase I facilities are completed prior to the closure of the landfill, this impact should not occur. Moreover, it should be understood that the landfill will close when it is filled irrespective of the SWMC's development.

32) Please see response to Comment 3 of the State Solid Waste Management Board and Response 19 (this section).

33) As stated by the DEIR, facility wastewater flows are not expected to require pre-treatment prior to discharge to the EBMUD collection/treatment system. The final version of the EIR displays recent independently gathered data regarding representative wastewater constituents associated with tipping-floor washdowns and ash-quenching.

34) Comment acknowledged. The SWMC does not preclude intensification of recycling efforts; in fact, if such efforts were sucessful to the point of removing all combustionable materials from the received (or processed) solid waste stream, the incinerators could be abandoned and sold to another user.

35) Comment acknowledged. The Final EIR has been expanded to include these potential impacts.

36) Firstly, the SWMC (as presently conceptualized) would have several modular

incinerators, thereby, vastly reducing the chances of total energy recovery system shut-down. Secondly, incinerator break-down, even if total, would not require the City to haul processed waste materials with the collection fleet as is inferred by the comment. Finally, the conceptual design of the SWMC is modular wherein several functional components (i.e. flea market, recycling center, etc.) can operate independent of the processing and incineration components.

37) Comment acknowledged. The Final EIR has been expanded to include this candidate mitigation measure.

38) Comment acknowledged. See new section (Selection Rationale - Chapter VII- Alternatives) within the Final EIR.

39) The statement has been corrected to read: "there are no known significant effects..."